NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

NPDES Permit No. MD0068322
State Discharge Permit No. 11-DP-3318

ANNUAL UPDATE NUMBER 23
FISCAL YEAR 2018

Submitted to:

State of Maryland
Department of the Environment
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Submitted by:

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December 17, 2018

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Section I. Introduction

A. Background

Since passage of the Federal Water Pollution Control Act Amendments of 1972, subsequent amendments have increasingly emphasized the quality control of stormwater runoff. The most recent revision, the Water Quality Act of 1987, establishes permit requirements for both Municipal Separate Storm Sewer Systems (MS4s) and stormwater discharges associated with industrial discharges. Section 402(p) of the Act requires phased permit applications, compliance requirements, and deadlines for application submission and approval.

On November 16, 1990, the final National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges were published in the *Federal Register*. The Regulations establish permit conditions for large (serving populations greater than 250,000) and medium (serving populations greater than 100,000 but less than 250,000) MS4s. Included are requirements to effectively prohibit non-stormwater discharges into storm sewers and controls to reduce the discharge of pollutants to the maximum extent practicable. The Regulations also require NPDES permits for stormwater discharges associated with certain industrial activities.

The U.S. Environmental Protection Agency (USEPA) has delegated review and permitting authority for Maryland's large and medium municipalities to the Maryland Department of the Environment (MDE). Within the MDE, the Water Management Administration (WMA) is responsible for issuing permits to designated municipalities.

B. Howard County, Maryland

Howard County referred to as "the County", with population of 317,233 according to the Howard County Department of Planning and Zoning (DPZ) July 2018 population data, is one of five medium and five large jurisdictions in Maryland that is regulated by a MS4 Permit. Additionally, the Maryland State Highway Administration also is under permit. Howard County's first permit, (MS-HO-95-008, which was subsequently renumbered to MD0068322, 99-DP-3318), went into effect on April 17, 1995 and expired on April 17, 2000. During this period, Howard County undertook an extensive effort to improve Maryland's water quality and became a state and national leader in the control of stormwater. Howard County's second permit, (Number MD0068322, 00-DP-3318), went into effect on June 15, 2000 and expired on June 15, 2005. This permit included conditions that reflected Howard County's progress toward stormwater management (SWM) program implementation under its NPDES MS4 permit. The County's third permit (Number MD0068322, 00-DP-3318), which went into effect on June 20, 2005 was to expire on June 20, 2010, but due to a delay in the issuance of the County's fourth permit, the County continued to operate under its third permit per MDE until December 18, 2014 when the fourth permit was issued. The conditions of the fourth permit (Number MD0068322, 11-DP-3318), are similar to previous permits. As required by the conditions of the permit, the County must prepare Annual Updates to report on the progress made during the preceding permit year. As also required in year four of the permit, this Annual Update includes the County's Reapplication for NPDES Stormwater Discharge Permit under Section III. Program Review and Annual Progress Reporting.

C. Annual Update Number 23

For Annual Update Number 20 (AR20), MDE required breaking out two six-month permit periods to report on permit compliance under the County's third and fourth permits. Therefore, Annual Update Number 21 (AR21) was the first to report on a full year under the County's fourth NPDES MS4 Permit. Annual Update Number 23 (AR23) is the third full-year report but is considered the report for the fourth year under the County's current NPDES MS4 Permit. Information is presented in the following parts and sections:

Section I. Introduction

Section II. Standard Permit Conditions

Section III. Program Review and Annual Progress Reporting

Section IV. Special Programmatic Conditions

Each section generally begins with the permit conditions, which are denoted in bold italics. Following each permit condition, as applicable, is a description of the progress made towards meeting the permit conditions within the annual update reporting year. Annual data are compiled/reported on a fiscal year basis.

It is important to note that, with this Annual Update Number 23, Howard County is reapplying for its next (fifth generation) NPDES Stormwater Discharge Permit. Information pertaining to the reapplication is found in Section III. Program Review and Annual Progress Reporting.

Section II. Standard Permit Conditions

A. Permit Administration

Howard County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall, in its annual reports, submit to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

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The County has included the current organizational information as a narrative file included in the geodatabase. Mr. Mark S. Richmond, Chief of the SWMD, is the liaison with MDE and can be reached at (410) 313-6413 or msrichmond@howardcountymd.gov.

B. Legal Authority

Howard County shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's annual report.

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The County previously submitted a certification from the County Attorney to MDE, which stated that the County possesses the authority to directly perform the activities described in 40 CFR 122.26(d)(2)(i) and the NPDES permit. Specifically, the County Office of Law has certified that the laws of Howard County, Maryland provide adequate legal authority to carry out Howard County's NPDES Permit for Operators of MS4 programs. The legal authority is adequate to implement programs that control the quality as well as the quantity of water that is discharged through its storm sewer system.

C. Source Identification

Sources of pollutants in stormwater runoff countywide shall be identified and linked to specific water quality impacts on a watershed basis. The source identification process shall be used to develop watershed restoration plans. The following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated tables as required in PART V of this permit:

1. ***Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;***

2. ***Industrial and commercial sources: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants;***

3. ***Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;***

4. ***Impervious surfaces: public and private land use delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;***

5. ***Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual; and***

6. ***Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.***

Annual Update Number 23 Status

Updated versions of the County's Source Identification GIS data (items 1. – 6. above) are provided on the DVD included in Section IV of this Annual Update. Several items related to Source Identification are noted below:

Storm Drain System

Outfall records are included in the Outfall and OutfallDrainageArea feature classes of the MDE NPDES Geodatabase. There are currently 394 outfalls that meet the requirements of being major MS4 outfalls. Each of the 394 major MS4 outfalls has a corresponding drainage area in the OutfallDrainageArea feature class. Non-major outfalls are added to the Outfall feature class as a result of the IDDE inspections. In order to fully document the inspection in the database the outfall where the inspection occurred needs to be included in the database regardless of its major/non-major NPDES outfall status. The County is currently developing a method for prioritizing the delineation of drainage areas for non-major outfalls. Other County GIS storm drain system layers are also included with the data submittal including outlets, inlets, stormdrains and manholes.

The permit requires that drainage areas be delineated to all BMPs in the County. BMP drainage areas are submitted as the BMPDrainageAreas feature class in MDE's NPDES Geodatabase. The difference between the total number of BMPs and the number of BMP drainage areas is attributable to BMPs such as dry wells, and other small single lot LID practices, where it is impractical to delineate a drainage area to such a localized BMP. At present the County has no plans for delineating drainage areas to each of these individual lot BMPs, but these BMPs are factored into the pollutant removal computations discussed later in this Annual Update. Per MDE's database requirements, records stored in the AltBMPLine, AltBMPPoint, and AltBMPPolygon feature classes do not have a corresponding drainage area.

Industrial and Commercial Sources

Howard County obtained SDAT data which identified approximately 2500 commercial and industrial parcels in the county. All commercial and industrial parcels were then entered into the Commercial/Industrial CRM database. The County set a goal of conducting a visual survey of 500 sites each year in order to perform a visual survey on each site within the five-year permit term. In FY18, 625 sites were surveyed. The surveys are conducted by the four inspectors in the Stormwater Management Division who also inspect stormwater management facilities and perform illicit discharge field investigations. During the survey, the inspectors photograph each site, and if they find a suspected discharge they try to determine the source. Back in the office they complete a Field Data Sheet and enter the site information, photos, and scanned Field Data Sheet into the Commercial/Industrial CRM database. Any suspected discharges are referred to the County's IDDE Team Leader and the corresponding Field Data Sheet and photos are saved into the SWMD's shared drive. The IDDE Team Leader then follows up on and resolves the suspected discharge. GIS data representing the potential industrial and commercial sources and the FY18 assessed sites is included as a separate GIS layer.

Urban Best Management Practices (BMPs)

Urban BMP data are included in multiple feature classes and tables in the geodatabase including BMPPOI, BMP, AltBMPLine, AltBMPPoly, BMPInspections, AltBMPLineInspections, AltBMPPolyInspections, RestBMP, and RestBMPInspections. These feature classes and tables encompass development BMPs, restoration projects, and alternative BMPs. For the purposes of annual reporting this urban BMP summary will include the BMPPOI, BMP and BMPInspection tables and the other data are described below under Water Quality Improvement Projects; however in reality there is much overlap between the two sections.

Howard County is currently transitioning its stormwater BMP management and accounting system to the point of investigation or POI framework. The method accounts for smaller dispersed BMPs built under MDE's Environmental Site Design (ESD) guidance as required by the Stormwater Management Act of 2007. The POI method accounts for nested BMPs and provides an accounting framework for impervious area treatment that avoids double counting but accounts for volumes treated by upstream BMPs. BMPs within a POI system are linked by their drainage patterns and volumes and impervious surfaces are computed as a system.

Impervious Surfaces

As a requirement of section PART IV.E.2.a of the NPDES MS4 Discharge Permit issued by MDE to Howard County, the County must conduct an impervious surface area assessment to define the restoration efforts required under the permit to restore 20% of remaining Countywide baseline impervious acres not already restored to the MEP. The restoration is required to be complete by December 2019, the end of the current permit term.

Howard County first conducted its baseline impervious accounting analysis and reported on the methods and results in the Countywide Implementation Strategy (CIS) completed in December 2015. The CIS was submitted to MDE with the County's NPDES annual report (AR20). Howard County made edits to the analysis based on MDE's comments on the County's methodology and submitted an updated version in December of 2016 with its annual report (AR21). Changes included a revised date for determining restoration projects credited towards baseline reduction versus restoration, additional County data resources being further prepared, and basic progress completed during FY2016. MDE reviewed the County's impervious area assessment submitted in December 2016 and provided comments and an approved impervious area baseline on April 13, 2017. Revisions to the County's impervious baseline accounting following MDE's approval were provided and discussed in an additional version of the accounting document in December 2017 submitted with the County's annual report (AR22).

As part of the impervious area accounting and restoration process, MDE has allowed for each Phase I MS4 municipality to submit an updated and revised impervious baseline in year 4 of the current permit, which for

Howard County is 2018. The revised baseline can include changes related to newly documented BMPs, updates to restoration BMP crediting, and improvements in the supporting GIS data and databases. In addition, the County is proposing revisions to its Municipal Separate Storm Sewer System (MS4) area; which, in turn, will affect impervious baseline accounting calculations. A detailed description of the datasets and analysis used to delineate a refined MS4 area are included in a report (Howard County MS4 Area Revision Methodology and Results, December 2018) prepared and submitted to MDE with this FY2018 Annual Report (AR23) (McCormick Taylor, 2018).

As described in the report the two primary factors that Howard County has accounted for in the MS4 area revision process are ownership and operation of the stormwater system, and stormwater drainage and pass through. To define the Howard County MS4 area, State and federal properties are excluded from the County's responsibility. Additionally, industrial facilities with NPDES permits are also excluded. Howard County has included the Census Urbanized Area, County owned property and roadway right of way, and those areas that drain to and through the County's currently mapped stormwater system including outfalls, stormdrain infrastructure, and stormwater BMPs. At this stage, the County has elected to include drainage to stormwater BMPs that are under private ownership and operation but reserves the right in the future to exclude these areas if they do not drain to County owned or operated stormwater infrastructure.

Howard County has selected a conservative method to delineate a refined MS4 area that includes areas that it could justifiably exclude. The MS4 area as described in this report is the area used to establish the impervious area baseline for setting the County's 20% restoration goal. Per MDE guidance, the baseline accounting is set to a 2002 date, wherein areas developed post-2002 are deemed fully treated based on implemented stormwater regulations requiring treatment of at least 1-inch of stormwater runoff. Therefore, when establishing the 2002 conditions under this revised MS4 area, parcels with development dates after 2002 were excluded. Results of the assessment and the County's revised 20% goal are reported in section II.E.2 of this report.

The County will continue to provide stormwater services Countywide and will implement its stormwater programs in a similar manner. MS4 permit conditions under items IV.C Source Identification, IV.D. Management Programs, IV.F Assessment of Controls, and IV.G Program Funding will continue to be implemented Countywide.

Howard County is submitting revised impervious GIS data layers with this annual report. Included in the submittal are the new revised MS4 area boundary, and the 2002 baseline impervious layer with jurisdictional classification.

Monitoring Locations

The County's NPDES monitoring locations and associated drainage areas are included in the database in the MonitoringSite feature class. Monitoring locations include both the biological and chemical monitoring sites for the Wilde Lake subwatershed monitoring and the Red Hill Branch subwatershed monitoring conducted in fulfillment of Part IV.F.1 Watershed Restoration Assessment.

Part IV.F.2 Stormwater Management Assessment is being conducted at the Rumsey Run project site. Locations of the geomorphic monitoring locations are included with the data submittal as a separate GIS layer.

Howard County conducts monitoring at several other sites beyond what the NPDES permit requires. These sites include the Turf Valley and Dorsey Hall monitoring studies which are further described under permit condition IV.F.1 of the annual report. Monitoring site locations for these sites are included in the MonitoringSite feature class of the geodatabase.

Water Quality Improvement Projects

Water quality improvement projects are stored in several features and tables including RestBMP, AltBMPLine, AltBMPPoly, AltBMPPoint and their associated Inspection tables of the new MDE NPDES Geodatabase. For this database, the County is using the expiration of our 3rd generation permit date of June 20, 2010 as the cutoff between projects associated with the old, versus the current permit; however all improvement projects are included in the dataset.

The RestBMP feature class contains 2,005 records, with 1,924 completed, 78 records in planning (design phase), and 3 records in construction. Each RestBMP record has a corresponding inspection record in the RestBMPInspections table. The REINSP_DATE field of the RestBMPInspections table does not allow for null values, so a default value of 12:00AM was assigned when no re-inspection was performed. 2,000 of the RestBMP records have a corresponding drainage area in the BMPDrainageArea feature class. The 5 records without a corresponding drainage area are planned projects in early design phase without a drainage area available. They will be added to the database as the projects progress.

The AltBMPLine feature class contains 153 records with 96 stream restorations and 57 outfall stabilizations. The project numbers include recent updates the County has made to projects deemed stream restoration and outfalls. The IMPL_STATUS field is populated with the current status as of June 30, 2018 with 112 of these records being complete, 40 in planning, and 1 in construction. An inspection record for each of the completed projects is included in the AltBMPLineInspections table.

The AltBMPPoly feature class contains 2,848 records with 2,668 tree plantings, 173 stormdrain vacuuming, and 7 street sweeping records, one for each the County's major watersheds. The County is reporting credits for street sweeping for impervious restoration and TMDL compliance using the average of the annual tonnage collected from FY11 through FY18. The County tracks stormwater inlet and pipe cleaning efforts conducted by the Bureau of Highways for impervious and stormwater credits. There are 87 stormdrain vacuuming records for FY18. Each AltBMPPoly record has a corresponding inspection record in the AltBMPPolyInspections table.

The AltBMPPoint feature class includes 7,891 total records including 22 septic connections to public wastewater systems and 234 septic system upgrades to denitrification systems dating back to 2011. There also 125 planned septic system upgrades. This year there are 7,510 septic pumping entries dating back to 2013 and up through 2018. Howard County compiles septage hauling and manifest data to maintain a comprehensive list of unique records. Pump-outs from the last 5-yr period (FY14-FY18) were used for impervious crediting. Septic load reductions for some of the records are calculated and reported in the database, however it is the County's current understanding that reductions achieved from septic practices may not be credited towards the urban MS4 sector and only impervious credits associated with septics are used in the County's progress modeling.

D. Management Programs

The following management programs shall be implemented in areas served by Howard County's MS4. These management programs are designed to control stormwater discharges to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.

1. Stormwater Management

An acceptable stormwater management program shall continue to be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the 2000 Maryland Stormwater Design Manual. This includes:

i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
iii. Reporting annually the modifications that have been made or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Howard County.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.

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Stormwater Management Act Compliance
The County continues to comply with the Act and implement ESD to the MEP for new and redevelopment projects under the current version of the Design Manual, including the 2009 revision for ESD, as well as provide feedback

on that version, as necessary. The County has had no modifications to the design manual requirements, and there are no programmatic problems to address at this time.

In 2017, Council Resolution CR94-2017 revised Volume I (Storm Drainage) of the Design Manual to mandate a specified amount of rainfall for 100-year storms; to clarify provisions related to open channels; to amend provisions related to stormwater management facilities in Howard County; and to make technical changes related to Volume I, Storm Drainage, of the Design Manual.

Stormwater Management Programmatic and Implementation Information
Stormwater management is reviewed for compliance with the Howard County Design Manual, Volume I – Storm Drainage, throughout the development process by Planning and Zoning – Development Engineering Division. The programmatic and implementation information identified as i. – iv. above has been included in this Annual Update in the database under Stormwater Management as required by Part V of the County's MS4 Permit.

Construction Inspection
Stormwater construction inspections are the responsibility of Public Works – Construction Inspection Division. A summary of the stormwater construction inspections and violation notices issued is listed in Table 1 and is listed in the SWM Associated Table in the geodatabase.

Table 1: Construction Inspections

Summary of Inspections and Violations	Total July 1, 2017 – June 30, 2018
Number of Construction Inspections	11,315
Number of Construction Violations	137

Preventative Maintenance Inspections
The SWMD is responsible for SWM BMP inspections, which continue to be performed for County, Board of Education, and private SWM facilities on a triennial basis. A summary of the inspections from July 1, 2017 through June 30, 2018 is listed in Table 2. There are currently 1,313 County-maintained BMPs, 157 Board of Education BMPs, and 2,743 privately owned and maintained BMPs, and 3,496 privately owned and maintained residential ESD BMPs for a total of 7,709 BMPs, which are inspected on a three-year cycle.

Table 2: Preventative Maintenance Inspections

Inspection Detail	Inspections July 1, 2017 - June 30, 2018
Maintenance Inspections	3,110
County Maintained BMPs	381
Board of Education Maintained BMPs	28
Privately Maintained BMPs	918
Residential ESD BMPs	1,783
Follow-up Inspections	521
Enforcement Actions (Extra Follow Up)	2 Citation / 13 NOVs
Total	3,646

** The inspection cycle for Board of Education Maintained BMPs begins once the students are released for the summer of each year.*

The County sends a letter to the owner of any BMP needing corrective action (structural or non-structural) giving them a deadline for addressing the items. The County performs follow up inspections to verify that compliance is achieved. If the owner does not comply, a citation or NOV is issued. A Notice of Violation is a warning letter providing owner 14 days from the date of the letter to either correct the deficiencies or request an extension in writing. A citation is the legal action taken to initiate an actual fine or civil penalty against the owner. This action takes place if after 14 days, there has been no contact with the owner.

Inspections for tree planting sites are performed by the Department of Recreation and Parks. Inspections are performed according to the Policies and Procedures: Reforestation Tree Planting on Public and Private Lands, Inspecting Forest Conservation Easements, and Inspecting Forest Conservation Easements with GIS Tools. Inspections for voluntary BMPs on private property and those installed by Howard EcoWorks, formerly READY, are performed by the Office of Community Sustainability. Long-term verification Inspections for stream restoration projects are performed by the SWMD.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;

b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE;

c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and

d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

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Howard County submitted its renewal application for delegation of erosion and sediment control enforcement authority on October 6, 2016. MDE conducted a field review on October 18 and 20, 2016 and completed its review on November 4, 2016 and provided a verbal recommendation of MDE's extension delegation for the maximum 2-year period. MDE's written review and re-authorization letter was received on January 24, 2017. The delegation authority is effective through June 30, 2019. On September 28, 2018 Howard County submitted its renewal application for continued delegation of erosion and sediment control enforcement authority.

Program Improvements

To maintain and improve inspection skills and current knowledge of laws and specifications the Construction Inspection Division (CID) requires all inspection staff to participate in self-paced training. Topics include E&S Law, Proper Documentation and Lessons Learned (a historical look at common problems and solutions)

The Erosion and Sediment Inspection Manual is regularly updated to reflect changes in laws, specifications and division policy regarding Erosion and Sediment Control.

Responsible Personnel Certification
In accordance with the re-authorization letter issued by MDE on May 1, 2015 the following process is in place relative to the Responsible Personnel certification:

"This training may now be taken on MDE's website and all inquiries should be referred to this on-line application that will now satisfy the County's MS4 permit obligations."

MDE issues the certification online. All of the CID staff and consultants have taken the online class, registered in MDE website and acquired their Responsible Personnel Certifications.

Program Activity
The electronic program activity information has been included in this Annual Update, in the database under Erosion Sediment Control Associated Table as required by Part V of the County's MS4 Permit.

Earth Disturbances > 1 acre
Construction Inspection Division submits quarterly reports for earth disturbances greater than one acre directly to MDE. This information is also included in the Annual Report database under Quarterly Grading Permit Feature Class and Quarterly Grading Permit Information Associated Table as required by Part V of the County's MS4 Permit.

3. Illicit Discharge Detection and Elimination

Howard County shall continue to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. ***Field screening at least 100 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. Within one year of permit issuance, an alternative program may be submitted for MDE approval that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system;***

b. ***Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;***

c. ***Maintaining a program to address and, if necessary, respond to illegal discharges, dumping, and spills;***

d. ***Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and***

e. ***Reporting illicit discharge detection and elimination activities as specified in PART V of this permit.***

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Howard County's Illicit Discharge Detection and Elimination (IDDE) program incorporates four components to meet the permit requirements:

- Prevention Program
- Detection Program
- Removal and Compliance Program
- Program Management and Reporting

Prevention Program

The County's IDDE Program uses public outreach and in-house employee training to prevent illicit discharges. Outreach is also done at community events such as the annual "GreenFest" event. In-house training is performed for County departments involved in the handling of chemicals and in the maintenance of facilities. The County developed a brochure for general distribution to the public to provide education about the role that the County's IDDE Program and they play in eliminating pollution entering our waterways. The brochure is available in County offices and is mailed out to targeted audiences as part of the County's outreach program. The County also utilizes an illicit discharge reporting form on its SWMD website with a hotline number for public reporting of an illicit discharge. The web address is:

https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Environmental-Services/Stormwater-Management/Illicit-Discharges

Illicit discharge complaints can also be reported through the TellHoCo smart phone app. In addition, the County is proactively surveying all commercial and industrial sites in the County to identify potential illicit discharges.

Detection Program

Updates on FY2016 and FY2017 sites that were under investigation include:

1. FY2016 Outfall 220107
   Dry weather flow discovered and reported in FY2016 during an outfall screening at local outfall 220107. This flow was listed with a status of "Source under investigation" on the IDDE table of the database submitted with Howard County's FY2016 Annual Report. This is a case of data entry error; this flow was in fact eliminated in FY2016, and was reported as such on page 16 of the narrative portion of the County's FY2016 MS4 Annual Report (O'Donnell Honda, Ellicott City, MD – vehicle washing discharge). The discrepancy between the narrative and the IDDE table is simply an oversight on the County's part in updating the field data on the IDDE table to reflect a change in the status of the two flows after their initial discovery and recording (i.e., once the flow was eliminated, the entries in the ILLICIT_ELIM field should have been updated from "I" [Source under investigation] to "E" [Eliminated]).
2. FY2016 Outfall 221289
   Dry weather flow discovered and reported in FY2016 during an outfall screening at local outfall 221289. This flow was listed with a status of "Source under investigation" on the IDDE table of the database submitted with Howard County's FY2016 Annual Report. This is a case of data entry error; this flow was in fact eliminated in FY2016, and was reported as such on page 16 of the narrative portion of the County's FY2016 MS4 Annual Report (Lancaster Foods, Jessup, MD – industrial food waste discharge). The discrepancy between the narrative and the IDDE table is simply an oversight on the County's part in updating the field data on the IDDE table to reflect a change in the status of the two flows after their initial discovery and recording (i.e., once the flow was eliminated, the entries in the ILLICIT_ELIM field should have been updated from "I" [Source under investigation] to "E" [Eliminated]).

3. FY2017 - God Speed Auto, 6360 South Hanover Road, Elkridge. Howard County is conducting follow-up inspections.

   God Speed Auto, 6360 South Hanover Road, Elkridge, MD 21075: On October 21, 2016, a County contractor reported evidence of a mild milky/cloudy substance at local outfall 219534 near Harwood Business Park and God Speed Auto. A chemical test was performed and all parameters were within limits. An inspection of the upstream storm drain system and surrounding drainage areas was conducted. A dry whitish stain of unknown substance and origin was discovered on a nearby parking lot close to a storm drain inlet. It is believed that the substance which created the whitish stain entered the storm drain system at some earlier time and accumulated at the outfall. Due to an inability to identify the party responsible for the spill, no enforcement action was taken regarding this matter and the case was closed.
4. FY2017 - Taylor Farms, 7920 Tar Bay Drive, Jessup. Howard County is conducting follow-up inspections on potential discharge of food-processing wastes.

   Investigation concluded that this case was an illicit discharge and traced the source to Del Monte Fresh Produce at 7971 Tar Bay Drive, Jessup. Enforcement action was taken in FY2018.
5. FY2017 - 6333 Macaw Street, Elkridge. Howard County is conducting follow-up inspections on potential vehicle wash water discharge.

   Local Outfall 219115, 6333 Macaw Court, Elkridge, MD 21075: On October 19, 2016, a County citizen reported a slimy/flaky orange/copper-colored substance at Local Outfall 219115. County contractors performed a chemical test and all parameters were within limits. The substance was determined to be iron floc resulting from naturally occurring iron-oxidizing chemotrophic micro-organisms. This case is closed.
6. FY2017 - 6725 Santa Barbara Court, Elkridge. Howard County is conducting follow-up inspection on potential trash disposal.

   Investigation concluded that this case was an illicit discharge. Enforcement action was taken in FY2018.
7. FY2017 - Alister Town Center, 5331 Columbia Road, Columbia. Howard County is discussing trash clean-up practices with the apartment management company.
   Investigation concluded that this case was an illicit discharge. Enforcement action was taken in FY2018.

Howard County investigated 82 cases in FY18, which were identified through the three programs in place to detect illicit discharges.

A. The first program is the inspection of at least 100 outfalls per year. The inspections in FY18 were in the Deep Run watershed, the Route 1 corridor, and the Route 40 corridor. The County provides maps to the contractor showing the areas where the inspections must be conducted. The contractor then identifies at least 100 outfalls to inspect. They visit the outfalls at least 72 hours after a precipitation event and look for flow. If they see any flow, they collect a sample and analyze it for the required analytes. They then trace the discharge up the storm drain system to identify the source. The contractor then calls the County IDDE Team Leader to report the discharge, so the County can follow up with the property owner to stop the discharge. For FY18, the County's contractor inspected 101 outfalls. Of the 101 outfalls inspected in this reporting period, one suspected discharge was identified and revisited (TEST_NUM = 2). The suspected discharge is described below:

    1. The Maryland Food Center Authority, 7460 Conowingo Avenue, Jessup, MD 20794: On November 16, 2017, during an outfall screening inspection, a Howard County Contractor discovered an outfall discharge with an elevated pH and traced the discharge back to the Maryland Produce Market. On December 12, 2017, Howard County issued a Notice of Violation to The Maryland Food Center Authority requiring that they bring the pH of their discharge into the acceptable

range of 6.5-8.5. The cause of the elevated pH is believed to be a leaking water valve draining through a limestone parking lot substrate into the storm drain. The leaking water main has been fixed and compliance monitoring is underway. Further enforcement actions will be pursued as necessary.

B. The second program is a visual survey of commercial/industrial parcels, conducted by County inspectors. If the inspectors see any suspected discharges, they try to identify the source and notify the IDDE Team Leader. In this reporting period the County conducted 625 visual surveys and identified 10 potential discharges, which are described below.

1. Fesco Emergency Sales, 7010 Troy Hill Drive, Elkridge, MD 21075: On July 17, 2017, Howard County inspectors discovered a foamy substance discharging into a roadway and storm drain inlet. Further investigation found that this discharge originated from a fire-retardant and prevention system that was being repaired by Fesco at the time of the discharge. Fesco personnel were notified and the discharge was immediately eliminated. Fesco was counseled via email and field meetings on better practices to prevent any further discharges.
2. HIAB USA, Inc., 7591 Dorsey Run Road, Jessup, MD 20794: On August 8, 2017, Howard County inspectors discovered a leaking dumpster, several puddles of oil-contaminated water, and multiple areas of the gravel parking area saturated with automotive fluids, and an uncontained leaking dumpster. On August 8, 2017, Howard County issued a NOV to HIAB USA, requiring that they seal and contain their dumpster to prevent leakage, remove and dispose of all contaminated soils, and institute housekeeping practices to prevent and clean-up any future spills. Compliance was achieved on September 26, 2017 and the case was closed.
3. New Image Landscaping, Inc., 7531 Montevideo Road, Jessup, MD 20794: On August 8, 2017, Howard County inspectors discovered evidence that wood chips and top soil were being washed from New Image property into a storm drain inlet on an adjoining property. On August 29, 2017, Howard County issued a NOV to New Image Landscaping requiring that they control and contain the runoff of landscaping materials from their property. Compliance was achieved on September 26, 2017 and the case was closed.
4. Ex-cel Tree Experts, 7549 Montevideo Road, Jessup, MD 20794: On August 8, 2017, Howard County inspectors discovered evidence that wood chips and sediment were being washed from New Image property into a storm drain inlet on an adjoining property. On August 29, 2017, Howard County issued a NOV to Ex-cel Tree Experts requiring that they control and contain the runoff of wood chips and sediment from their property. Compliance was achieved on September 26, 2017 and the case was closed.
5. BDC Oakland Mills LLC, 7194 Oakland Mills Road, Columbia, MD 21046: On October 19, 2017, Howard County inspectors discovered a large plastic tank leaking an unidentified foaming liquid onto the ground in a location likely to pollute the storm drain system. On November 28, 2017, Howard County issued a Notice of Violation to BDC Oakland Mills LLC requiring them to contain and prevent current and future leaks. Compliance was achieved on December 7, 2017 and the case was closed.

6. Apple Ford Lincoln, 8800 Stanford Blvd, Columbia, MD 21045: On January 26, 2018, Howard County inspectors discovered a pool and trail of water outside of a dealership carwash. Further investigation found the cause of this condition to be wet vehicles leaving the carwash dripping residual rinse water. The floor drain and air blower inside the carwash were inspected and found to be functioning properly. The residual water trail is acceptable, case closed.
7. Tri-State Collision Center, 8916 McGaw Court, Columbia, MD 21045: On January 30, 2018, Howard County inspectors discovered a stream of commercial carwash runoff entering the storm drain system. On February 6, 2018, Howard County issued a Notice of Violation to Tri-State Collision Center requiring them to properly capture, contain, and dispose of all commercial carwash runoff to prevent prohibited discharges to the storm drain system. Compliance was achieved on March 5, 2018 and the case was closed.
8. Maryland Pro Investments LLC and Boston Market Corporation, 9380 Baltimore National Pike, Ellicott City, MD 21042: On April 23, 2018, a Howard County inspector discovered overflowing grease dumpsters surrounded by litter and grease stains on a nearby storm drain inlet indicating that grease was discharged into the storm drain system. On May 24, 2018, Howard County issued Notices of Violation to both Maryland Pro Investments LLC (property owner) and Boston Market Corporation (tenant operator) requiring them to clean the discharged contaminants and institute housekeeping practices to prevent further prohibited discharges. Compliance was achieved on June 6, 2018 and the case was closed.
9. Oakland Ridge LLC and Pro Wash Auto Spa LLC, 9110 Red Branch Rd, Unit M, Columbia, MD 21045: On May 25, 2018, a Howard County inspector discovered contaminated wash water from a commercial car wash operation being discharged to the storm drain system. On June 13, 2018, Howard County issued Notices of Violation to Oakland Ridge LLC (property owner) and Pro Wash Auto Spa LLC (tenant operator) requiring them to properly capture, contain, and dispose of all wash water from commercial vehicle washing operations. Compliance was achieved on July 5, 2018 and the case was closed.
10. Centennial Crossing LLC and Goodwill Industries of the Chesapeake Inc., 10164 Baltimore National Pike, Ellicott City, MD 21042: On May 24, 2018, a Howard County inspector discovered floatable trash and debris being discharged to the storm drain system. On June 6, 2018, Howard County issued Notices of Violation to both Centennial Crossing LLC and Goodwill Industries of the Chesapeake Inc., requiring them to collect and properly dispose of the discharged contaminants and institute housekeeping practices to prevent further discharges. Compliance was achieved on June 20, 2018 and the case was closed.

C. The third program is a response to reports of illicit discharge received from the public, other Howard County departments, MDE, or EPA. This category also includes happenstance discoveries made by Howard County Stormwater Management inspectors in the course of their duties. Howard County responded to 70 complaints/reports in FY18:

- 43 reports were received directly from the public via phone, email, postal mail, County website submission, “TellHoCo” web app, or walk-in.
- 17 reports referred by other Howard County agencies.

- 7 reports were made internally, issues discovered by Stormwater Management Inspectors.
- 3 reports were referred by MDE.
- 1 report was referred by EPA.

Removal and Compliance Program
The County uses the procedure described below to address illicit discharges.

Initial Response: Phone call, email, or inspection. The inspector will complete a Field Inspection Report. The report will identify any problems identified and actions required, including possible notification, referral, and/or collaboration with other government agencies. This method is used with both industrial/commercial discharges and residential (individual or Homeowners Association) discharges.

Notice of Violation: The County issues a Notice of Violation (NOV) for more serious or repeat discharges. The NOV will require the owner to respond within two weeks with a plan of action, and to perform corrective action within a specified time frame (typically 60 days).

Citation: In the case of very serious or repeat (unabated) discharges, the County will issue a civil citation. Under Howard County Code, prohibited discharges and illicit connections are a criminal misdemeanor subject to a fine not exceeding $900.00, or imprisonment not exceeding five months or both. Alternatively, or in addition to and concurrent with criminal penalties, the County may enforce prohibited discharges and illicit connections as a Class A civil offense, subject to a minimum fine of $500 and a maximum fine of $1000 per day.

Abatement/Compliance Verification: The County will request that all illicit discharge violators submit proof (photos, contractor's inspection notes, e-mail or notarized letter) that compliance was completed within the specified time frame. If necessary, the County will follow up at violation sites to ensure that compliance occurs in a timely and effective manner. Visual observation and, if necessary, monitoring will be performed to verify that the illicit discharge was stopped, and/or necessary permit obtained.

Howard County issued 72 Notices of Violation related to 51 cases of Illicit Discharge during FY18, described below:

1. Happy Garden Chinese Restaurant, 7284-C Cradlerock Way, Columbia, MD 21045: On July 10, 2017, an Inspector from the Howard County Bureau of Utilities notified SWMD of an outdoor grease dumpster leaking grease into an adjacent parking lot and storm drain inlet. On July 19, 2017, Howard County issued Notices of Violation to Happy Garden Chinese Restaurant requiring that they clean the spilled grease, maintain good housekeeping practices, and train staff on the proper use of the grease container and cleaning procedures. Compliance was achieved on July 28, 2017 and the case was closed.
2. Chang Lee, 2905 Ramblewood Road, Ellicott City, 21042: On July 19, 2017, a Howard County resident phoned in a complaint of a potential residential heating-oil spill. On July 20, 2017, Howard County verified the spill, and notified MDE oil-control personnel (Jim Richmond). On August 16, 2017, Howard County issued a NOV to the homeowner, Mr. Chang Lee. Mr. Lee was required to remove any contaminated soil and transport it to an appropriate disposal facility (Soil Safe) where it was analyzed and properly disposed of. Compliance was achieved on August 16, 2017 and the case was closed.
3. Corrigan Sports Enterprises, 6725 Santa Barbara Court, Suite 114, Elkridge, MD 21075: On July 27, 2017, Howard County Stormwater Management Inspectors witnessed Corrigan Sports employees rinsing-out 55-gallon drums with a pressure washer and allowing the discharge to enter a storm drain inlet. On August 16, 2017, Howard County issued a NOV to Corrigan Sports, requiring that they discharge their rinse water to the sanitary sewer. Compliance was achieved on August 16, 2017 and the case was closed.
4. Council of Condominium Owners, 6725 Santa Barbara Court, Elkridge, MD 21075: On October 26, 2016, a County contractor reported a significant accumulation of trash and debris dumped in and around a storm

drain outfall and stream channel. On August 18, 2017, Howard County issued a NOV requiring the property owner to collect and properly dispose of the floatable trash and debris. Compliance was Achieved on November 3, 2017 and the case was closed.

5. Del Monte Fresh Produce N.A. Inc., 7971 Tar Bay Drive, Jessup, MD 20794: On July 27, 2017, a Howard County citizen reported a rancid smell emanating from a storm water management pond in Jessup. Inspectors located a slimy fluid discharge draining into the pond and traced it to a leaking food scrap dumpster at Del Monte Fresh Produce. On August 9, 2017, Howard County issued a NOV to Del Monte requiring that they seal and contain their dumpster to prevent leakage. Compliance was achieved on August 22, 2017 and the case was closed.
6. HIAB USA, Inc., 7591 Dorsey Run Road, Jessup, MD 20794: On August 8, 2017, during a Commercial/Industrial Site Inspection, Howard County inspectors discovered a leaking dumpster, several puddles of oil-contaminated water, and multiple areas of the gravel parking area saturated with automotive fluids, and an uncontained leaking dumpster. On September 8, 2017, Howard County issued a NOV to HIAB USA, requiring that they seal and contain their dumpster to prevent leakage, remove and dispose of all contaminated soils, and institute housekeeping practices to prevent and clean-up any future spills. Compliance was achieved on September 26, 2017 and the case was closed.
7. New Image Landscaping, Inc., 7531 Montevideo Road, Jessup, MD 20794: On August 8, 2017, during a Commercial/Industrial Site Inspection, Howard County inspectors discovered evidence that wood chips and top soil were being washed from New Image property into a storm drain inlet on an adjoining property. On August 29, 2017, Howard County issued a NOV to New Image Landscaping requiring that they control and contain the runoff of landscaping materials from their property. Compliance was achieved on September 26, 2017 and the case was closed.
8. Miguel Tobon, 6654 Mohawk Court, Columbia, MD 21046: On August 7, 2017, a Howard County citizen reported unauthorized grading and sedimentary discharges to a County waterway. A joint inspection by Howard County and MDE (Punam Tyagi) disclosed unauthorized stream bank disturbances and fill placed within the stream channel. On October 12, 2017, Howard County issued a NOV to the property owner, Mr. Miguel Tobon. The NOV required Mr. Tobon to obtain the required permits, remove the unauthorized fill from the stream, and stabilize the streambank. This case is still open with compliance monitoring underway.
9. Ex-cel Tree Experts, 7549 Montevideo Road, Jessup, MD 20794: On August 8, 2017, during a Commercial/Industrial Site Inspection, Howard County inspectors discovered evidence that wood chips and sediment were being washed from New Image property into a storm drain inlet on an adjoining property. On August 29, 2017, Howard County issued a NOV to Ex-cel Tree Experts requiring that they control and contain the runoff of wood chips and sediment from their property. Compliance was achieved on September 26, 2017 and the case was closed.
10. American Community Management & Chamberlain Contractors, 5651 Harpers Farm Road, Columbia, MD 21044: On August 15, 2017, a citizen complaint submitted via email reported a discharge of asphalt sealant to the storm drain system. On September 9, 2017, Howard County issued Notices of Violation to both American Community Management (the property owner), and Chamberlain Contractors (contractor that applied the sealant) requiring that they institute practices and procedures to prevent a recurrence of the discharge. Compliance was achieved on September 18, 2017 and the case was closed.
11. Alister Town Center, 5331 Columbia Road, Columbia, MD 21044: On February 24, 2017 a resident reported an accumulation of trash and debris in a stream on Alister Town Center property. On August 18, 2017 Howard County issued a NOV requiring the property owner to clean all trash and debris from the stream and to institute a routine stream inspection and clean-up program. Compliance was Achieved on August 25, 2017 and the case was closed.
12. Royal Farms, 8686 Washington Boulevard, Jessup, MD 20794: On September 5, 2017, Howard County received an email from MDE (James Craig) describing a report from the EPA of a dumpster leaking cooking

oil and kitchen grease into the storm drain system. On September 9, 2017, Howard County issued a Notice of Violation to Royal Farms requiring them to clean and dispose of the leaked contaminants and institute better housekeeping and training practices. Compliance was achieved on September 26, 2017 and the case was closed.

13. M.T. Project Management, 6725 Santa Barbara Court, Elkridge, MD 21075: On September 7, 2017, Howard County inspectors witnessed prohibited discharges from a pressure washing operation entering a storm drain inlet. On September 27, 2017, Howard County issued a Notice of Violation to M.T. Project Management requiring that they institute wash water containment, collection, and disposal practices to prevent further prohibited discharges. Compliance was achieved on October 9, 2017 and the case was closed.
14. Clouse Trucking, Inc., Intersection of Route 29 & Route 216, Laurel, MD 20723: On September 7, 2017, the Howard County Department of Fire and Rescue Services reported an accident involving a milk tanker vehicle spilling its contents into the storm drain system. On October 10, 2017, Howard County issued a Notice of Violation to Clouse Trucking, Inc., requiring them to institute training and procedures to prevent future discharges. Compliance was achieved on October 17, 2017 and the case was closed.
15. The Cheesecake Factory & Mall in Columbia Business Trust, 10300 Little Patuxent Parkway, Columbia, MD 21044: On September 14, 2017, Howard County inspectors discovered grease spilling from a grease receptacle into a storm drain inlet. On October 6, 2017, Howard County issued Notices of Violation to The Cheesecake Factory (tenant operator) and The Mall in Columbia Business Trust (property owner) requiring them to clean the spilled contaminants from the storm drain system and institute practices to prevent further illicit discharges. Compliance has not yet been achieved. Additional enforcement actions are underway (see the next section for citations issued).
16. BRE/DP MD LLC, 8350 Bristol Court, Jessup, MD 20794: On September 14, 2017, Howard County received a citizen complaint of 200 tires dumped in and around a stream channel. On September 19, 2017, Howard County issued a Notice of Violation to BRE/DP MD LLC, requiring them to remove and dispose of the tires. Compliance was achieved on October 10, 2017 and the case was closed.
17. Sherwin Williams & D&D 100 LLC, 6650 Santa Barbara Road, Suite B, Elkridge, MD 21075: On September 20, 2017, Howard County inspectors discovered a large accumulation of trash and floatable debris littering the parking lot at Sherwin Williams in a position likely to pollute the storm drain system and waterways. On October 12, 2017, Howard County issued Notices of Violation to both Sherwin Williams (tenant operator) and D&D 100 LLC (property owner) requiring them to collect and dispose of all litter, trash, and debris, and institute improved waste management practices. Compliance was not immediately achieved and additional enforcement actions were required (see the next section for citations issued).
18. On the Spot Mobile Detailing, LLC, Ellicott City Parking Lot 'F': On October 4, 2017, Howard County received a citizen report of commercial vehicle wash water being discharged to the storm drain system. On October 17, 2017, Howard County issued a Notice of Violation to On the Spot Mobile Detailing, LLC, requiring that they institute practices and procedures to properly contain, collect, and dispose of vehicle wash water. Compliance was achieved on October 23, 2017 and the case was closed.
19. Grandfather's Garden Center, Inc., 5320 Phelps Luck Drive, Columbia, MD 21045: On October 4, 2017, the Howard County Health Department reported spills and leaks of automotive fluids and other hazardous materials, as well as accumulations of floatable trash and debris; MDE was notified (James Wagner) and performed joint inspections with officials from Howard County. On October 16, 2017, Howard County issued a Notice of Violation to Grandfather's Garden Center requiring they collect and dispose of all contaminated soils; close and contain all leaks and exposed hazardous substances; institute spill prevention and response procedures. This case is still open with compliance monitoring underway.
20. Crossroads Pub, 4809 Ten Oaks Road, Dayton, MD 21036: On October 15, 2017, Howard County received a citizen complaint of food scraps, cooking oil, and kitchen grease, and wash water being discharged to the storm drain system. On October 18, 2017, Howard County issued a Notice of Violation to Crossroads

Pub requiring that they properly clean and dispose of the discharged contaminants and institute housekeeping practices to prevent further discharges to the storm drain system. Compliance was achieved on October 30, 2017 and the case was closed.

21. Bestway Recycling LLC, 6599 Washington Boulevard, Elkridge, MD 21075: On September 27, 2017, Howard County was notified by MDE (Punam Tyagi) of oil spills, leaking appliances, and accumulations of scrap metal. On October 31, 2017, Howard County issued a Notice of Violation to Bestway Recycling LLC requiring them to properly clean and dispose of all oil/chemical spills, store scrap electronics and appliances under cover, apply for a 12-SW permit through MDE, and institute practices and measures to prevent further spills and discharges. Compliance was achieved on November 17, 2017 and the case was closed.
22. Camp BowWow, Coventry School for Dogs, & J 2 J LLC, 7165 Oakland Mills Road, Columbia, MD 21046: On November 17, 2017, Howard County inspectors observed wash water contaminated with pet waste entering the storm drain system. On December 7, 2017, Howard County issued Notices of Violation to Camp BowWow (tenant operator), Coventry School for Dogs (tenant operator), and J 2 J LLC (property owner) requiring that they institute practices to contain and capture all wash water. Compliance was not immediately achieved and additional enforcement actions were required (see the next section for citations issued).
23. BDC Oakland Mills LLC, 7194 Oakland Mills Road, Columbia, MD 21046: On October 19, 2017, during a Commercial/Industrial Site Inspection, Howard County inspectors discovered a large plastic tank leaking an unidentified foaming liquid onto the ground in a location likely to pollute the storm drain system. On November 28, 2017, Howard County issued a Notice of Violation to BDC Oakland Mills LLC requiring them to contain and prevent current and future leaks. Compliance was achieved on December 7, 2017 and the case was closed.
24. Williamson's Nursery, 8895 Frederick Road, Ellicott City, MD 21043: On November 9, 2017, a Howard County inspector discovered stockpiles of landscaping materials being stored in the floodplain, in a location likely to pollute the Hudson Branch waterway. On December 20, 2017 Howard County issued a Notice of Violation to Williamson's Nursery requiring them to relocate all unstable landscaping materials to a contained storage area outside of the floodplain. Compliance was achieved on March 5, 2018 and the case was closed.
25. Flahart Transport Inc., Eastbound Rt. 216, Laurel, MD 20723: On November 12, 2017, the Howard County Department of Fire and Rescue Services reported an accident involving a milk tanker vehicle spilling its contents into the storm drain system. On November 14, 2017, Howard County issued a Notice of Violation to Flahart Transport Inc., requiring them to institute training and procedures to prevent future discharges. Compliance was achieved on November 27, 2017 and the case was closed.
26. MG Deliveries Inc., Amberton Road, Elkridge, MD 21075: On November 3, 2017, Howard County received a citizen complaint of automotive fluids being discharged to the streets and storm drain system. On January 5, 2018, Howard County issued a Notice of Violation to MG Deliveries Inc. requiring that they discontinue routine maintenance of vehicles along County roadways and illicit discharges of automotive fluids. Compliance was achieved on February 1, 2018 and the case was closed.
27. The Maryland Food Center Authority, 7460 Conowingo Avenue, Jessup, MD 20794: On November 16, 2017, during an outfall screening inspection, a Howard County Contractor discovered an outfall discharge with an elevated pH and traced the discharge back to the Maryland Produce Market. On December 12, 2017, Howard County issued a Notice of Violation to The Maryland Food Center Authority requiring that they bring the pH of their discharge into the acceptable range of 6.5-8.5. Compliance monitoring is underway, this case remains open.
28. Council of Unit Owners at Whiskey Bottom South Condominiums, Abrar Hussain, & Shania Patterson, 9240 Bridle Path Lane, Unit F, Laurel, MD 20723: On March 26th, 2018, Howard County received a citizen complaint of household trash being dumped along a stream bank and into a stream channel. On April 18,

2018 Howard County issued Notices of Violation to the Council of Unit Owners at Whiskey Bottom South Condominiums (HOA and open space property owner), Abrar Hussain (condominium owner), and Shania Patterson (condominium tenant) requiring that they remove and properly dispose of the trash that was deposited in and along the stream. Compliance was achieved on June 14, 2018 and the case was closed.

29. Club Pooche, 9147 Red Branch Road, Columbia, MD 21045: On January 12, 2018, Howard County received a citizen complaint of gravel being discharged to a vehicle right-of-way and the storm drain system. On January 23, 2018, Howard County issued a Notice of Violation to Club Pooche requiring them to clean and contain the gravel, which had escaped from a pet-care area that they own and operate. Compliance was achieved on February 26, 2018 and the case was closed.
30. Merritt-GJ1 LLC, 4 Wall Entertainment Inc., Fleetwash Inc., 9525 Berger Road, Columbia, MD 21046: On January 23, 2018, Howard County inspectors discovered runoff from a commercial mobile car washing operation entering a storm drain inlet. On January 31, 2018, Howard County issued Notices of Violation to Merritt-GJ1 LLC (property owner), 4 Wall Entertainment Inc. (tenant), and Fleetwash Inc. (car wash operator), requiring them to properly capture, contain, and dispose of all commercial carwash runoff to prevent prohibited discharges to the storm drain system. Compliance was achieved on February 9, 2018 and the case was closed.
31. Tri-State Collision Center, 8916 McGaw Court, Columbia, MD 21045: On January 30, 2018, Howard County inspectors, during a Commercial/Industrial site inspection, discovered a stream of commercial carwash runoff entering the storm drain system. On February 6, 2018, Howard County issued a Notice of Violation to Tri-State Collision Center requiring them to properly capture, contain, and dispose of all commercial carwash runoff to prevent prohibited discharges to the storm drain system. Compliance was achieved on March 5, 2018 and the case was closed.
32. Michael C. Williamson, 9051 Dunloggin Court, Ellicott City, MD 21042: On February 7, 2018, Howard County received a citizen complaint of unpermitted clearing and filling occurring along the Hudson Branch waterway, resulting in prohibited sedimentary discharges; MDE (Punam Tyagi) was notified and performed a joint inspection with officials from Howard County. On March 8, 2018 Howard County issued a Notice of Violation to Michael C. Williamson requiring him to cease all unpermitted activity in and along the waterway and restore the area to its prior condition. Compliance was achieved on March 5, 2018 and the case was closed.
33. Lu & Joe's Inc. and Somsak & Pavana Chanyasulkit, 1024 Ridge Road, Mt. Airy, MD 21771: On March 5, 2018 an inspector from the Howard County Health Department discovered a cloudy fluid discharging from a patio drain at Lue & Joe's to an area likely to pollute the Patuxent River. On March 12, 2018, Howard County issued Notices of Violation to both Lu & Joe's Inc. (tenant operator) and Somsak & Pavana Chanyasulkit (property owners) requiring they clean and dispose of the contaminated discharge and institute housekeeping practices to prevent further prohibited discharges. Compliance was achieved on April 19, 2018 and the case was closed.
34. James Brigmon, 6396 Glenmore Avenue, Elkridge, MD 21075: On March 7, 2018, Inspectors from Howard County and MDE (Punam Tyagi & Debra Correia), responding jointly, discovered unpermitted fill that had been placed in and along Deep Run resulting in prohibited discharges to the waterway. On March 14, 2018, Howard County issued a Notice of Violation to Mr. Brigmon requiring that he remove all unpermitted fill and restore the area to its previous condition. Compliance was achieved on April 6, 2018 and the case was closed.
35. 7641 Montevideo Road LLC, 7641 Montevideo Road, Jessup, MD 20794: On March 8, 2018, Inspectors from Howard County and MDE (James Craig, Sean McKewen, Paula Stonesifer, Punam Tyagi, Debra Correia) discovered unpermitted clearing, filling, excavating, and discharge of sedimentary pollutants in a County wetland and waterway. On March 29, 2018, Howard County issued a Notice of Violation to 7641 Montevideo Road LLC requiring that they acquire the necessary permits and restore the area to its

previous condition. Compliance has not yet been achieved. Engineering plans developed to address this discharge are under review by Howard County Department of Planning & Zoning and MDE.

36. F&S Associates Limited Partnership, 9190 Red Branch Road, Columbia, MD 21045: On March 5, 2018, Howard County inspectors discovered unpermitted filling, grading, and discharge of sedimentary pollutants to the County storm drain system and waterways. On March 29, 2018 Howard County issued a Notice of Violation to F&S Associates Limited Partnership requiring them to obtain the necessary permits and restore the area to its previous condition. Compliance has not yet been achieved. A $15,000.00 fine and Court Order have been issued requiring the property owner to address the damage.
37. LKQ Corporation and Baltimore Auto Recycling Inc., 8125 Washington Boulevard, Jessup, MD 20794: On March 9, 2018 a citizen complaint was submitted to the Howard County Health Department regarding automotive fluids being washed into a stream. On April 3, 2018, Howard County issued Notices of violation to both LKQ Corporation (tenant operator) and Baltimore Auto Recycling (property owner) requiring them to implement practices that will prevent further illicit discharges of prohibited substances. Compliance was not immediately achieved and additional enforcement actions were required (see the next section for citations issued).
38. LRVC Business Trust, 8795 Cloudleap Court, Columbia, MD 21045: On April 6, 2018, the Howard County Council reported an accumulation of litter and trash in a stormwater management pond. On April 17, 2018, Howard County issued a Notice of Violation to LRVC Business Trust requiring that they remove and dispose of the accumulated trash. Compliance has not yet been achieved, further enforcement actions are being considered.
39. Mohammed Mufti, 12440 Frederick Road, West Friendship, MD 21794: On April 19, 2018, a Howard County inspector discovered top soil being stockpiled in a roadside storm drain swale. On April 30, 2018, Howard County issued a Notice of Violation to Mohmmed Mufti requiring him to remove the sedimentary materials from the storm drain system. Compliance has not yet been achieved, further enforcement actions are being considered.
40. Laurel Auto House, 10092 Washington Boulevard, Laurel, MD 20723: On April 19, 2018, Howard County received a citizen complaint of runoff contaminated with salt and automotive chemicals being discharged to the storm drain system and waterways near Washington Boulevard in Jessup. MDE (Punam Tyagi, Scott Haines, & Jim Wagner) was notified of this matter and conducted a joint inspection with Howard County on May 10, 2018. On May 14, 2018, Howard County issued a Notice of Violation to Laurel Auto House requiring that they clean, contain, and control all chemical substances, automotive parts, and tires located on their property; institute better housekeeping practices; and develop a spill prevention and response protocol. Compliance monitoring is underway in collaboration with MDE and further enforcement measures are being considered.
41. Molsen Haghighat, 10080 Washington Boulevard, Laurel, MD 20723: On April 19, 2018, Howard County received a citizen complaint of runoff contaminated with salt from uncontained salt piles being discharged to the storm drain system and waterways near Washington Boulevard in Jessup. On May 21, 2018, Howard County issued a Notice of Violation to Laurel Auto House requiring that they clean, cover, contain, and/or dispose of all salt accumulations located on the property. Compliance was achieved on June 14, 2018 and the case was closed.
42. Troy Hill II LLC, 7045 Troy Hill Drive, Elkridge, MD 21075: On April 21, 2018, Howard County received a citizen complaint of floatable trash and debris being discharged from a large warehouse parking lot into the storm drain system and waterways. On May 9, 2018, Howard County issued a Notice of Violation to Troy Hill II LLC requiring that they clean the floatables from the storm drain system and waterways and institute housekeeping practices to prevent further illicit discharges. Compliance was achieved on May 18, 2018 and the case was closed.
43. Maryland Pro Investments LLC and Boston Market Corporation, 9380 Baltimore National Pike, Ellicott City, MD 21042: On April 23, 2018, during a Commercial/Industrial site inspection, a Howard County inspector

discovered overflowing grease dumpsters surrounded by litter and grease stains on a nearby storm drain inlet indicating that grease was discharged into the storm drain system. On May 24, 2018, Howard County issued Notices of Violation to both Maryland Pro Investments LLC (property owner) and Boston Market Corporation (tenant operator) requiring them to clean the discharged contaminants and institute housekeeping practices to prevent further prohibited discharges. Compliance was achieved on June 6, 2018 and the case was closed.

44. Brian J. Kemp, 10094 Carillon Drive, Ellicott City, MD 21042: On May 1, 2018, Howard County received a citizen complaint of wood chips being discharged into a storm drain catchment. On June 5, 2018, Howard County issued a Notice of Violation to Brian J. Kemp requiring him to refrain from discharging wood chips, lawn waste, landscaping materials, and any other prohibited materials to the storm drain system. Compliance was achieved on June 11, 2018 and the case was closed.
45. Merritt-CM1 LLC, Chutney Indian Restaurant, Royal Pizza, Subs & Wings, Pho Dat Thanh Vietnamese Restaurant, 9400 Snowden River Parkway, Columbia, MD 21045: On May 2, 2018, inspectors from Howard County Health Department reported kitchen grease and floatable trash being discharged from a collection of restaurant dumpsters into the storm drain system. On May 25, 2018, Howard County issued Notices of Violation to Merritt-CM1 LLC, Chutney Indian Restaurant, Royal Pizza, Subs & Wings, Pho Dat Thanh Vietnamese Restaurant, requiring that they clean the discharged contaminants and institute housekeeping practices to prevent further prohibited discharges. Compliance has not yet been achieved. Further enforcement actions are being considered.
46. James R. Misner III, 5054 Whetstone Road, Columbia, MD 21044: On May 10, 2018, Howard County received a citizen complaint of masonry bricks being dumped in and along a stream channel. Howard County verified the complaint and notified MDE (Punam Tyagi & Debra Correia). On June 5, 2018, Howard County issued a Notice of Violation to James R. Misner III requiring him to remove the bricks and dispose of them in a proper manner. Compliance was achieved on June 21, 2018 and the case was closed.
47. Pacific Resources Associates LLC, Arby's Inc., and Itek Construction & Consulting Inc., 3290 Centennial Lane, Ellicott City, MD 21042: On May 5, 2018, Howard County received a citizen complaint regarding construction debris (Styrofoam pellets) being discharged to the storm drain system. On May 25, 2018, Howard County issued Notices of Violation to Pacific Resources Associates LLC (property owner), Arby's Inc. (tenant operator), and Itek Construction & Consulting Inc. (construction contractor) requiring that they properly clean and dispose of the discharged contaminants and institute housekeeping practices to prevent further discharges. Compliance was achieved on May 25, 2018 and the case was closed.
48. Oakland Ridge LLC and Pro Wash Auto Spa LLC, 9110 Red Branch Rd, Unit M, Columbia, MD 21045: On May 25, 2018, during a Commercial/Industrial Site inspection, a Howard County inspector discovered contaminated wash water from a commercial car wash operation being discharged to the storm drain system. On June 13, 2018, Howard County issued Notices of Violation to Oakland Ridge LLC (property owner) and Pro Wash Auto Spa LLC (tenant operator) requiring them to properly capture, contain, and dispose of all wash water from commercial vehicle washing operations. Compliance was achieved on July 5, 2018 and the case was closed.
49. Centennial Crossing LLC and Goodwill Industries of the Chesapeake Inc., 10164 Baltimore National Pike, Ellicott City, MD 21042: On May 24, 2018, during a Commercial/Industrial Site inspection, a Howard County inspector discovered floatable trash and debris being discharged to the storm drain system. On June 6, 2018, Howard County issued Notices of Violation to both Centennial Crossing LLC and Goodwill Industries of the Chesapeake Inc., requiring them to collect and properly dispose of the discharged contaminants and institute housekeeping practices to prevent further discharges. Compliance was achieved on June 20, 2018 and the case was closed.
50. Capital Home Group LLC, 6391 Forest Avenue, Elkridge, MD 21075: On June 8, 2018, Howard County Department of Fire and Rescue Services received a citizen complaint of contaminated residential basement drainage be discharged to the storm drain system. On June 20, 2018, Howard County issued a

Notice of Violation to Capital Home Group LLC requiring them to institute housekeeping measures to prevent and further prohibited discharges. Compliance monitoring is in progress and further enforcement action will be taken as needed.

51. German Rengifo, Maria Rodriguez, Patricia Driscoll, and John Eric Morris, 3879 & 3899 College Avenue, Ellicott City, MD 21043: On June 8, 2018, Howard County received a report from MDE (Punam Tyagi) regarding illegal dumping of trash and debris a Howard County stream. On June 8, 2018, Howard County issued Notices of Violation to German Rengifo, Maria Rodriguez, Patricia Driscoll, and John Eric Morris, requiring them to collect and dispose of the discharged materials. Compliance monitoring is underway and further enforcement action will be taken as needed.

Howard County issued 11 Citations related to four cases of Illicit Discharge during FY18, described below:

1. The Cheesecake Factory & The Mall in Columbia Business Trust, 10300 Little Patuxent Parkway, Columbia, MD 21044: On September 14, 2017, Howard County inspectors discovered grease spilling from a grease receptacle into a storm drain inlet. On October 6, 2017, Howard County issued Notices of Violation to both The Cheesecake Factory & The Mall in Columbia Business Trust requiring them to clean the spilled contaminants from the storm drain system and institute practices to prevent further illicit discharges. Upon the discovery of repeat violations, Howard County issued civil citations on February 27, 2018 to both The Cheesecake Factory & The Mall in Columbia Business Trust, with a fine of $500/day until the violation is abated. On June 27, 2018, Howard County issued second civil citations to both The Cheesecake Factory & The Mall in Columbia Business Trust, with a fine of $1000/day until the violation is abated. Compliance has not yet been achieved; further enforcement actions are upcoming, including the possibility of litigation.
2. Sherwin Williams & D&D 100 LLC, 6650 Santa Barbara Road, Suite B, Elkridge, MD 21075: On September 20, 2017, Howard County inspectors discovered a large accumulation of trash and floatable debris littering the parking lot at Sherwin Williams in a position likely to pollute the storm drain system and waterways. On October 12, 2017, Howard County issued Notices of Violation to both Sherwin Williams (tenant, operator) and D&D 100 LLC (property owner) requiring them to collect and dispose of all litter, trash, and debris, and institute improved waste management practices. Upon the discovery of repeat violations, Howard County issued civil citations on December 28, 2017 to both Sherwin Williams and D&D 100 LLC, with a fine of $500/day until the violation was abated. Compliance was achieved on January 2, 2018. The citation was settled on January 31, 2018 and the case was closed.
3. Camp BowWow, Coventry School for Dogs, & J 2 J LLC, 7165 Oakland Mills Road, Columbia, MD 21046: On November 17, 2017, Howard County inspectors observed wash water contaminated with pet waste entering the storm drain system. On December 7, 2017, Howard County issued Notices of Violation to Camp BowWow (tenant operator), Coventry School for Dogs (tenant operator), and J 2 J LLC (property owner) requiring that they institute practices to contain and capture all wash water. Upon the discovery of repeat violations, Howard County issued civil citations on February 27, 2018 to Camp BowWow, Coventry School for Dogs, and J 2 J LLC, with a fine of $500/day until the violation was abated. Compliance has not yet been achieved. Engineering plans developed to address this discharge are currently under review by Howard County Department of Planning & Zoning.
4. LKQ Corporation and Baltimore Auto Recycling Inc., 8125 Washington Boulevard, Jessup, MD 20794: On March 9, 2018 a citizen complaint was submitted to the Howard County Health Department regarding automotive fluids being washed into a stream. On April 3, 2018, Howard County issued Notices of violation to both LKQ Corporation (tenant operator) and Baltimore Auto Recycling (property owner) requiring them to implement practices that will prevent further illicit discharges of prohibited substances. Compliance was not immediately achieved and additional enforcement actions were required (see the next section for citations issued). Upon the discovery of repeat violations, Howard County issued civil

citations on June 21, 2018 to LKQ Corporation and Baltimore Auto Recycling Inc. with a fine of $500/day until the violation is abated. Compliance has not yet been achieved. Engineering plans developed to address this discharge are currently under review by Howard County.

Seven cases were referred to MDE:

1. Chang Lee, 2905 Ramblewood Road, Ellicott City, MD 21042: residential oil spill on July 19, 2017 --notified MDE Oil Control Program.
2. Grandfather's Garden Center, 5320 Phelps Luck Drive, Columbia, MD 21045: unpermitted scrap tire storage on October 4, 2017 -- notified MDE Solid Waste Program.
3. Williamson's Nursery, 9051 Dunloggin Court, Ellicott City, MD 21042: unpermitted clearing and excavating in a floodplain, waterway, and non-tidal watershed on February 7, 2018 -- notified MDE Water & Science Administration Compliance Program.
4. James Brigmon, 6396 Glenmore Avenue, Elkridge, MD 21075: unpermitted fill in a floodplain, waterway, and non-tidal watershed on March 7, 2018 -- notified MDE Water & Science Administration Compliance Program.
5. LKQ Pick Your Part, 8125 Washington Boulevard, Jessup, MD 20794: significant prohibited discharges of sediment and chemical contaminants to waters of the state -- notified MDE Water & Science Administration Compliance Program.
6. Laurel Auto House, 10092 Washington Blvd, Laurel, MD 20723: discharge of chemical/automotive contaminants to storm drain system -- notified MDE Water & Science Administration Compliance Program.
7. James R. Misner III, 5054 Whetstone Road, Columbia, MD 21044: unpermitted fill in a floodplain, waterway, and non-tidal watershed on May 10, 2018 -- notified MDE Water & Science Administration Compliance Program.

Four types of cases were referred to other Howard County departments:

1. Water/sewer leaks (to Bureau of Utilities)
2. Construction site erosion & sediment control complaints (to Construction Inspection Division)
3. Trash nuisances & dumping, not affecting storm drains or waterways (to Health Department)
4. Prohibited vehicle storage not affecting storm drains or waterways (to Department of Planning & Zoning

Seven cases were investigated but found not to be illicit discharges, generally including:

- Iron floc
- Algae Bloom
- Groundwater flows
- Spills/leaks cleaned up before reaching a storm drain or waterway
- Allowable pool discharges

Three cases are still under investigation:

1. 9268 Broken Timber Way, Columbia, MD 21045: reported dumping of residential grass clippings into a County waterway.
2. 14064 Howard Road, Dayton, MD 21036: reported erosion and sedimentary discharge to a County waterway.
3. 9761 Clocktower Lane, Columbia, MD 21046: reported erosion and sedimentary discharge to the storm drain system.

Program Management and Reporting
Howard County's IDDE Program has a staff of six, including one engineer, one planner, and four inspectors, who carry out the duties of the IDDE Program. This involves following up on reported illicit discharges and proactively doing commercial and industrial site surveys. The inspectors immediately report any illicit discharges found and the manager follows up with the owner to eliminate and remediate the issue. IDDE field data sheets, inspection photos, and support documents such as e-mails and letters, are saved in hard copy as required by law, and in digital format to the County's IDDE database and/or local network servers. All IDDE screenings, surveys, inspections and enforcement actions are, recorded, tracked, and reported to MDE each year in the NPDES MS4 Annual Report.

Enhanced IDDE Program
Howard County, in the FY18 period, completed a pilot study for implementing an Enhanced IDDE Program for illicit discharge discovery and elimination to target priority nutrient and bacteria pollutants. The goal was to determine the level of pollutant loads associated with IDDE outfalls, identify potential mitigation measures, and understand the level of removal and crediting that may be accomplished with an enhanced IDDE program. The methods follow those described by the Chesapeake Stormwater Network (CSN, 2017) and the Bay Program's Expert Panel Report on the subject (CBP, 2014).

Field crews collected water quality samples for analysis from flowing outfalls and tested for a suite of parameters focused on nutrients and bacteria. Estimates of pollutant loads were made and each site was evaluated for remediation potential. The results of the FY18 investigation revealed several sites with elevated concentrations for a variety of pollutants; however upon further review of site conditions no site had any obvious source that was traceable and identifiable for solutions. The results of the pilot are included as a narrative file submitted with this annual report (KCI, 2018).

Despite the outcome of the FY18 pilot, Howard County is moving forward and implementing an enhanced IDDE program. The major change from the pilot to full implementation is that crews will only sample flowing outfalls when a likely human induced and correctable source is identified during the field investigation. The County developed a Standard Operating Procedure (SOP) for the Field Protocol for Howard County Enhanced IDDE dated 5/23/18, which is included as a narrative file submitted with this annual report. The SOP will be used by County inspectors, by County personnel responding to complaints, and by field crews performing routing IDDE inspections. Results of any identified and controlled sites from the FY19 period will be reporting the next annual report.

4. Litter and Floatables

This section of the permit requires Howard County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Howard County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

a. As part of Howard County's watershed assessments under PART IV.E.1 of this permit, Howard County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Howard County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:

i. Educating the public on the importance of reducing, reusing, and recycling;
ii. Disseminating information by using signs, articles, and other media outlets; and
iii. Promoting educational programs in schools, businesses, community associations, etc.

c. Evaluating annually the effectiveness of the education program.

d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.

Annual Update Number 23 Status

Recycling Division Programs
Howard County Recycling Division continues to provide many recycling opportunities and information to County residents and businesses, as well as County government operations. In 2017, a total of 238,145.00 tons of recyclables were recycled by businesses and residents. Of that, 29,256.52 tons of recyclables were collected curbside and 20,845.62 tons through drop-off programs at Alpha Ridge Landfill.

Weekly residential single stream recycling collection is provided to over 85,000 single family homes, townhouses, mobile home parks and condominiums. Three collection routes also have food scrap collection available to them. The Alpha Ridge Landfill Resident's Convenience Center accepts a wide variety of recyclable materials including: paint, manure, topsoil, reusable household items, wood waste, yard trim, food scraps, compressed gas tanks, electronics, rigid plastics, cardboard, foam padding, mattresses and box springs, reusable building materials, Styrofoam™, cooking oil, motor oil & filters, anti-freeze, wet cell batteries, clothing & textiles, tires, scrap metal and appliances, reusable bicycles, oyster shells and single stream recycling. All County residents may use the convenience center with proof of residency. Businesses may also use the center for recycling if the materials originated in the County. On-going recycling events include paper shredding, Christmas tree recycling, backyard composting, trash and recycling route surveys, and a variety of education and outreach programs to audiences of all ages. Single stream recyclables are collected from County buildings and facilities on a weekly schedule; County agencies also bring items to Alpha Ridge for recycling such as wood waste and yard trim.

The County provides education and outreach to the public on the importance of reducing, reusing, recycling and waste reduction through disseminating information in the following manners:

- During FY18, the Recycling Division distributed a significant amount of recycling and waste reduction literature to households and businesses that emphasize reducing, reusing and recycling. In addition, material was available through local libraries, public buildings and events. Outreach to businesses and residents was also achieved through the County's website, www.HowardCountyRecycles.org.
- A monthly e-newsletter is sent to 17,812 residents. Residents opt-in to receive this newsletter which highlights holiday schedule changes, shredding events, tips and updates on the recycling program. Recent newsletters can be found at www.howardcountymd.gov/NewsAndUpcomingEvents
- Print ads relevant to the importance of reducing, reusing, and recycling promoted to the public in the following:

- Armed Forces Directory
- Baltimore Sun
- The Business Monthly
- Epoch Newspaper
- Harvest Magazine
- Howard County Chamber of Commerce Directory
- Howard County Fair Catalogue
- Howard County Visitors Guide
- The Parent's Guide to Howard County
- The Pennysaver
- Senior Resource Guide
- Val-Pak
- Welcome to the Neighborhood

- Digital ads relevant to the importance of reducing, reusing, and recycling promoted to the public were run through Comcast Spotlight and Facebook.
- A promotional message was included with the property tax bill envelopes to promote the 'Know Before You Throw' recycling education campaign.
- Advertising signs were placed at the Columbia Mall promoting recycling.
- Promotional items that encourage recycling and include recycled content are available.
- Custom made windowed recycling carts are available for display at libraries and County buildings to highlight the many items that can be recycled.
- Recycling and waste reduction literature was distributed at libraries, schools, County buildings, community associations, senior centers, and businesses and directly to individuals. Brochures can also be found on the County's Recycling website at www.HowardCountyRecycles.org
- Regular outreach through social media such as Twitter, using the twitter account @HoCoRecycles promotes recycling, composting and waste reduction.
- A postcard providing positive feedback was sent to participants in the food scrap recycling program.

In addition, relevant education material was available through local libraries, public buildings and events. Outreach to businesses and residents was also achieved through the County's website, www.HowardCountyRecycles.org

The County's Recycling Coordinators provide educational programs in schools, businesses, community associations, etc. These efforts include:

- Participating in community, school and corporate events with a recycling exhibit and educational materials.
- Continued distribution of school recycling information through school programs, brochures and visually appealing lunchroom recycling posters in public and private schools at all age ranges.
- Presentations and tours at the Alpha Ridge Landfill.
- The School Board and the County continue to collaborate on a collection contract for trash and recycling. Collection is provided weekly for trash and recycling from lidded dumpsters as well as collection from wheeled, lidded carts for single stream recycling at all HCPSS schools and facilities. Seven schools participate in the food scrap collection program; collected foodscraps are composted at the County composting facility.

- Technical support provided as requested to businesses throughout Howard County. A section on specialty recycling along with business recycling options has been posted on the website at www.howardcountymd.gov/Business-Recycling.
- Creation of new education campaigns to encourage proper recycling (www.KnowBeforeYouThrow.org) and reduce wasted food (Food for Thought). Through online surveys the campaigns reached 2,849 and 629 people respectively.

Adopt-A-Road Program/Trash Collection

The County "Adopt-A-Road" volunteer program continues to be very successful. The Adopt-A-Road Summary in Table 3 below, provides a breakdown of the different zones for the Adopt-A-Road program from February 1, 2017 to May 25, 2018, that details the amount of trash collected, the mileage of road adopted, and the number of roads adopted by zones. More information about the Adopt-A-Road program can be found on the County's website: https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Highways/Adopt-A-Road-Program

Table 3: Adopt-A-Road Summary

Zone	Trash Bags Collected	Number of Roads Adopted	Estimated Miles Cleaned
Central	602	40	32
East	580	40	50
West	218	23	30
Total	***1400***	***103***	***112***

Howard EcoWorks Channel Maintenance Program

Howard EcoWorks removed 900 lbs of litter from the Tiber-Hudson channels before and after the town's flash flood event in May 2018. Roughly 300lbs were removed just before the flood and 600lbs after.

Howard EcoWorks regularly collects trash when doing tree maintenance work on County Forest Conservation Areas and stream restoration projects. There are currently 19 sites where Howard EcoWorks has done or continues to do this work. Volume and weight of litter collected are not tracked during these projects.

Office of Community Sustainability(OCS) Litter Removal and Education Efforts

Approximately 2,200 individuals participated in the County's 20 Minute Cleanup where members from all sections of the community are invited to spend 20 minutes one day during April cleaning up trash. After the 20 Minute Cleanup, an OCS representative asked the manager of the local Rite-Aid to please clean up their overflowing dumpsters since the 20 Minute Cleanup program had cleaned trash out of the woods just downstream of their dumpsters two years in a row. Within two weeks the manager had acted to better manage their dumpsters which are no longer overflowing.

Standing in for Recreation and Parks, OCS led a litter pick up at Savage Park during which 197lbs trash and 52lbs of recyclable material were collected and properly disposed.

Department of Recreation and Parks Programs

Natural Resources Division

Stream and Pond Cleanup Program

- Since 1996, the Department has actively recruited volunteers and tracked their efforts removing trash and other debris from Howard County's waterways. In FY2018, we had 41 volunteers spend 127 hours in this program. Volunteers collected 1,025 pounds of trash and an additional 1,338 pounds of bottles, cans, tires and scrap metal were recycled. Since 1996, we have had 2,622 people spend 5,806 hours cleaning our waterways. These figures reflect the Department's participation in the Baltimore regional stream and watershed clean-up effort, "Project Clean Stream". This was the ninth year the Department participated in the International Coastal Clean-up providing one location. Since 2000, 42.36 miles of streams/rivers and 102.2 acres of lakes and ponds areas have been cleaned. Trash collected since 2000 totals 2,992 pounds with an additional 20,572 pounds of trash recycled!

Park Operations

- Zone 1 has a variety of ways it uses to control the litter in their area. The main source of litter within the Zone is from the public, as well as its athletic field users. The control means for battling the refuse is by installing trash/recycle cans and by picking up all loose trash within the Zone. Staff spends roughly 2,190 hours picking up loose trash within their Zone and another 560 hours for emptying trash/recycle cans, for a total of 2,750hours per year on litter control. Zone 1 has 100 trash cans within its area. We estimate the weight in trash to be 110 tons per year. All trash is put into dumpsters and picked up twice a week. The trash is taken to a transfer station for proper disposal. In addition to trash cans, Zone 1 also has 100 recycle dumpsters within their Zone. Therefore, Zone 1 empties approximately 50 tons worth of recycling each year. The recycling is taken to recycling dumpsters that are emptied twice per week and taken to a recycling center for sorting. In total, Zone 1 removes approximately 160 tons worth of trash and recycling each year.
- Zone 2 maintains one hundred and thirteen 50-gallon trash cans throughout the parks, resulting in 48,000 lbs. of trash collected.
- Zone 2 maintains ninety 55 gallons recycle bins averaging 51,000 lbs. of recyclable material collected annually.
- Zone 4's annual trash removal estimates by weight equal 35,000 lbs. of trash and 38,000 lbs. of recycling. Zone 4 mitigates trash accumulation through two main strategies: picking up loose trash and trash can emptying. On average, three staff members spend one hour picking trash and pulling bags in the morning during our opening routine – totaling 1,095 annual man-hours of morning trash removal. On average, two staff members spend two hours each picking trash and pulling bags in the evening during our closing routine – totaling 1,460 annual man-hours of evening trash removal. On average, one staff member spends an entire day each week removing trash from our community parks as well as from Ellicott City parking lots and high school fields – totaling 416 annual man-hours of off-site trash removal. On average, total trash removal man-hours for Zone 4 equate to 2,791 hours each year.

Natural and Historic Resources Division

Park Ranger Walks

- In 2014, the Park Rangers of Howard County Recreation and Parks implemented "Ranger Walks." These walks are an outreach initiative committed to educating the park patrons on natural resource topics and encourage stewardship of the environment. The three "Walk" topics related to current efforts include: (1) The Native Tree Hike, which teaches the basics of tree identification, the importance of forest buffers and the benefits of trees; (2) The Watershed Walk provides various topics within water conservation and the effects of pollution on local tributaries that lead to the Chesapeake Bay watershed; (3) The Reptiles and Amphibians Walk takes patrons through the parks while exploring the wonderful world of turtles, snakes and frogs.

Howard County GreenFest

- FY2018 was the eleventh year for the County to host its' annual GreenFest. The theme this year was "Explore-Connect-Act" and featured many exhibits and vendors dealing with tree plantings, energy efficient home improvements, rain barrels, gardening and composting, Goodwill donations, as well as live bird and reptile displays. Other features included the County's recycling program, SWM Division talking about illicit discharge prevention, and community tree planting programs as well as many community groups focused on environmental awareness. Festival attendance this year was over 1,500 individuals. Since the beginning, attendance has reached over 202,800 people.

Innovative Recycling Programs and Demonstrations

Robinson Nature Center

- Robinson Nature Center partners with local and regional groups to promote programs that recycle organic materials for uses consistent with mitigating stormwater runoff and sediment discharge.
- Since 2013, Howard County Master Gardeners have held free compost demonstrations at the Center during which residents of the County are provided with instructions on how to create and manage their own backyard compost piles. Howard County's Office of Recycling provides free compost bins to residents at these demonstrations. The residential composting operations allow families to use organic, natural fertilizer in place of commercial and chemical fertilizer. In addition to providing the composting demonstration area, the staff at Robinson Nature Center actively composts organic food waste at the center.
- Since 2013, Robinson Nature Center has maintained a partnership with the Oyster Recovery Partnership. The Center has been working as an official drop-site for oyster shell recycling. Members of the public can drop their oyster shells at the Center's shell recycling caddie and staff from the ORP retrieves the shells for use in oyster reef recovery programs in the Chesapeake. The recycled shells provide substrate upon which new oysters can grow, thus helping revitalize the oyster population and its valuable ecosystem service of filtering the waters of the Chesapeake Bay. Robinson Nature Center has recycled over 50 bushels of shell. That shell will provide homes for nearly 250,000 baby oysters to be planted back into the Chesapeake Bay watershed.

Park Operations

- Zone 1 has 100 recycle dumpsters within their Zone which is pulled at least once per day. The average weight for recycle cans is roughly 40lbs. Therefore, Zone 1 empties roughly 480 tons worth of recycling each year. The recycling is taken to recycling dumpsters that are emptied twice per week and taken to a recycling center for sorting. In total, Zone 1 removes roughly 960 tons worth of trash and recycling each year.
- To promote recycling, the Zone 2 maintains thirty-five 55 gallons recycle containers and collected approximately 51,600 lbs. of recyclables. Twelve additional recycle containers were added with Blandair east area opening in March of 2018.
- To promote increased recycling within Zone 4, additional recycle cans were purchased and staged at various locations throughout our parks. Each trash can is accompanied by a recycling can – in accordance with Departmental policy.

Disseminating information by using signs, articles, and other media outlets

- The Robinson Nature Center facility educates the public about green technologies, sustainability, environmental stewardship and techniques that can help reduce stormwater runoff, as well as reducing water and energy consumption:
- Stormwater mitigation is achieved on the property through a pervious concrete parking lot, four separate bioretention/rain gardens and a green roof. These items are highlighted on our LEED tours which we offer

by group reservation as well as during special events throughout the year. The parking lot is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas. In FY18 we received support from Howard EcoWorks to complete significant maintenance of these rain gardens. The pervious concrete parking lot, green roof and rain gardens are also highlighted for visitors with interpretive signs.

- Interpretive signage in the building and on the center's grounds describe to visitors how different features reduce the environmental impact of the building by mitigating stormwater run-off and minimizing water and electricity use.
- A backyard demonstration area shows the public what they can do on their own properties to improve the management of water. Rain barrels demonstrate catchment of water for use in the garden and native plants demonstrate low-maintenance landscaping.
- The Chesapeake Bay exhibit (one of three permanent exhibits in the building) educates the public about water quality issues. A scaled reproduction of the Bay covering the floor of the exhibit allows visitors to walk the connections between Howard County and the Bay. Through interactive displays, visitors learn about the plight of oysters, how products they use can contribute to storm water runoff issues and how they can help save the Bay.
- A touch tank filled with sea creatures is in our Children's Discovery room. This tank serves as an extension to our Chesapeake Bay exhibit and further demonstrates how bodies of water are connected. Our educators and volunteers interpret the dependence of aquatic animals on our land use decisions that affect the quality of their habitat. Extensions of these concepts are also shared through docent carts through which volunteers discuss oysters and horseshoe crabs, two prominent species, in the Chesapeake Bay.
- In FY2018, Robinson Nature Center hosted over 35,000 visitors through the building.

Promoting educational programs in schools, businesses, community associations
Natural and Historic Resources Division

Students Branching Out

- In the spring of 2013 the Howard County Recreation and Parks partnered with the Office of Sustainability to apply for a grant from the Chesapeake Bay Trust. The purpose of the grant was to combine efforts at improving water quality and stream health with student education. $373,100 was awarded to be used by June 30th, 2015 for the involvement of students in planting 6,300 trees on a total of 47.5 acres.

- In the fall of 2013 further funding was requested to expand the Students Branching Out project. An additional $448,000 was granted to plant 8,000 more trees on 40 acres of school property and parkland by 2015. The Department of Public Works and the Howard County School System joined Recreation and Parks and Office of Sustainability to strengthen the outcome of the project by bringing together various areas of expertise.

- While the grant ended in 2015 The Department of Recreation and Parks and the Department of Community Sustainability want to continue planting efforts on school properties, partnering with teachers and students, as funding allows. Funding will come from Turf to Trees and Stream ReLeaf programs, so tree totals will be reported through those programs.

Year	Students Engaged
CY2017	265
Total	265

Trout in the Classroom at Robinson Nature Center

- Robinson Nature Center has continued to successfully raise Rainbow Trout in partnership with the Trout in the Classroom program. From January – June when the trout are growing at the Center, they serve as an educational tool and are utilized during school field trips, public programs and summer camps. Nature Center educators can demonstrate the value of clean water and healthy habitat using the trout as an example of an animal that has been impacted by human disturbance to the watershed. In FY2018, the Nature Center gave their fish to many Howard County schools prior to the end of the school year. Ultimately, students released over 110 trout into the Middle Patuxent River
- In FY2018, Robinson staff led 481 programs (including 101 field trips, 236 public programs, 31 camps, 16 scout programs, as well as 97 birthday parties). These programs engaged over 17,310 participants. Mission-driven programming connecting participants to their natural resources is a key component of the Nature Center's goals and promotes environmental stewardship to all generations. Key programs of note contributing to education on issues such as storm water runoff, recycling, pollution management and integrated pest management include:
    - Field Trips for elementary and secondary students including *World to A River Dweller*, *Water Works*, *It's Easy Being Green* and *Battlefield Earth*
    - Annual Native Plant Sale
    - Summer Camps including *River Explorers*, *Lil' Pine Cones Water Wonders*, *Lil' Acorns In, Around and Under the Water* and *Epic Water Ventures*
    - Special Events including *Wild for Water Day* and *Earth Day Puppet Show*
    - *Family River Romps* during the summer
    - *The Humane Gardener* author's talk
    - *Outdoors with Children: Getting Little Feet WET* teacher training

Environmental, Educational Events at Schools/Institutions of Learning

- Attended HCC's "Career Day", emphasized environmental education, internship opportunities and the Center's sustainability projects to 200 attendees.
- Exhibited at the Howard County Office of Children and Families Early Care in Education Conference. Approximately 350 child care professionals attended the conference. Provided flyers and literature about field trips and professional development opportunities facilitated by Robinson staff for educators and child care providers; Project Wet and Project Wild-Aquatic Wild, (Environmental curriculum that's water based).
- Participated in a "Service Learning Fair" at Howard Community College. Approximately 100 students engaged in the event.
- Exhibited at MAEOE's Annual Youth Summit. Approximately 2,750 students and educators from across Maryland attended our presentation of *It's Fun Living Green.*
- Participated in *Growing into Green Jobs* at the Howard County Conservancy with 200 students. Geared toward attracting young people into the Eco-industry.
- Tabled at Recreation and Parks Headquarters for Sustainability Day engaging 150 participants in interactive activities focused on water conservation and sustainability.
- Collaborated with Howard Community College for a workshop with local sites focusing on conservation stewardship projects such as pervious concrete, rain gardens, green roofs and other bio-retention projects.
- Eco-Tourism: Coordinated with Patuxent River Commission and Howard County Tourism and Promotion for Robinson to be included in the multi-county Patuxent River Challenge. The Challenge was initiated to educate the public about the river, water stewardship and various venues in which to engage in water activities on the river.
- Collaborated with The National Aquarium to develop Save the Bay Packages between our venues with

a goal to attract and educate tourists about the importance of environmental restoration efforts for Chesapeake Bay.

STEM/STEAM Events:

- Participated in Port Discovery's "STEM in Spring" an outreach science event. About 350 people from the region traversed through the museum.
- Exhibited at inaugural event at the Maryland International/STEM Academy in Elkridge. Engaged 500 people in STEM related activities.

5. Property Management and Maintenance

a. Howard County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County-owned municipal facility requiring NPDES stormwater general permit coverage. The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.

b. The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE approved alternative activities:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;
iv. Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and
v. Ensuring that all County staff receives adequate training in pollution prevention and good housekeeping practices.

The County shall report annually on the changes in any maintenance practices and the overall pollutant reductions resulting from the maintenance program. Within one year of permit issuance, an alternative maintenance program may be submitted for MDE approval indicating the activities to be undertaken and associated pollutant reductions.

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Bureau of Environmental Services (BES)

County Facilities – Notice of Intent (NOI)

The County has identified and listed County owned and municipal sites needing a permit below. Stormwater Pollution Prevention Plans (SWPPPs) are reviewed annually, updated as necessary and placed in the associated SWPPP binder.

County Landfills

As required by the industrial NPDES discharge permits, Howard County DPW monitors surface discharge from groundwater treatment systems. The County maintains General Industrial NPDES Discharge permits from MDE for New Cut and Carrs Mill landfills and an Individual Industrial NPDES Discharge permit with Stormwater for Alpha Ridge Landfill. Alpha Ridge Landfill is the only site under the NPDES permit that has stormwater requirements. The other two sites do not have stormwater requirements associated with their NPDES permits.

Alpha Ridge – The current State Discharge Permit #13-DP-3224, NPDES Permit #MD0067865 is effective as of 2/21/15 and will expire on 1/31/20. This permit required Howard County to apply for coverage under General Permit 12-SW. Howard County submitted the NOI and SWPPP for General Permit 12-SW on 8/5/15. MDE then assigned Registration of Application No. 12SW3054 and NPDES No. MDR003054 to this site. The landfill is still active, but the majority of Howard County's solid waste is transferred out of state to Virginia. Alpha Ridge Landfill still buries a small amount of the overall waste generated within the County. The transfer station has been operational since September 2005. The installation of the groundwater remediation system was completed in 2000 and has been operating since that time.

Park Equipment Maintenance Shops and Fueling Facilities

The MDE Wastewater Permits Program has agreed that the following park maintenance shops and fueling facilities are not required to apply for coverage under General Permit 12-SW. However, Howard County will continue to implement the BMPs identified in the previous SWPPPs at these sites.

- Cedar Lane Park Equipment Maintenance Shop
- Centennial Park Equipment Maintenance Shop
- Corridor Road Fueling Facility
- Rockburn Branch Park Equipment Maintenance Shop
- Savage Park Equipment Maintenance Shop
- Schooley Mill Equipment Maintenance Shop
- Western Regional Park Equipment Maintenance Shop

County Facility Wash Racks

In August 2011 a review of vehicle washing efforts at County fire stations, police stations, and several County parks identified the need for better treatment for vehicle wash water, in particular when vehicles are washed outside. As part of the design the County will harvest rainwater for use in vehicle washing operations. The County has completed a feasibility study and a preliminary design of all 14 locations. The entire budget for design and construction is approximately $4.8 million.

Construction is complete at six locations and ongoing at one location. Design is underway for two park locations. See list below of the status of all the vehicle wash pad/rainwater harvesting systems.

Table 4: Howard County Vehicle Wash Pad/Rainwater Harvesting Sites

Facility	Address	Vehicle Washing	Industrial Activities
Alpha Ridge Landfill	2350 Marriottsville Rd Marriottsville, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
Banneker Fire Station (#7)	5815 Banneker Rd Columbia, MD	Y - indoors only	N

Bethany Fire Station (#8)	9601 Old Frederick Rd Ellicott City, MD	Y - wash water is directed to sanitary sewer	N
Cedar Lane Park Maintenance Shop	5081 Cedar Lane Columbia, MD	N (washpad under design)	N
Centennial Park Maintenance Shop	10000 Route 108 Ellicott City, MD	Y – wash water is contained, pumped out, and delivered to the Recreation & Parks HQ wash bay	N
Central Maryland Transit Operations Facility	8800 Corridor Rd. Annapolis Junction, MD	Y - indoors only	Y - SWPPP
Clarksville Fire Station (#5)	5000 Signal Bell Lane Clarksville, MD	Y - indoors only	N
Cooksville Maintenance Shop	14212 Frederick Rd Cooksville, MD	Y - wash water is captured and trucked to WWTP	Y - SWPPP
Dayton Maintenance Shop	4301 Route 32 Dayton, MD	Y-wash water is captured and trucked to WWTP	Y - SWPPP
Elkridge Fire Station (#1)	5700 Rowanberry DriveElkridge, MD	Y-washwater is directed to sanitary sewer	N
Ellicott City Fire Station (#2) Ellicott City, MD	4150 Montgomery Rd Ellicott City, MD	Y - wash water is directed to sanitary sewer	N
Glenwood Fire Station (#13)	14620 Carrs Mill Rd Woodbine, MD	Y - wash water is recycled	N
Lisbon Fire Station (#4)	1330 Woodbine Drive Lisbon, MD	Y - indoors only	N
Long Reach Fire Station (#9)	5950 Tamar Drive Columbia, MD	Y - wash water is directed to sanitary sewer	N
Little Patuxent Water Reclamation Plant	8900 Greenwood Place Savage, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
Mayfield Maintenance Shop	7751 Mayfield Ave. Elkridge, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
Public Safety Training Center	2200 Scott Wheeler Dr Marriottsville, MD	Y – wash water is directed to sanitary sewer	N
Recreation & Parks Headquarters	7120 Oakland Mills Rd Columbia, MD	Y - indoors only	Y - SWPPP
Ridge Rd. Maintenance Shop	8800 Ridge Rd. Ellicott City, MD	Y - indoors only	Y - SWPPP
Rivers Park Fire Station (#10)	10155 Old Columbia Rd Columbia, MD	Y - indoors only, outdoor washpad under construction	N
Rockburn Branch Park Maintenance Shop	6105 Rockburn Branch Park Rd. Elkridge, MD	N	N
Savage Fire Station (#6)	8521 Corridor Rd Savage, MD	Y - wash water is directed to sanitary sewer	N

Savage Park Maintenance Shop	8400 Fair St. Savage, MD	N	N
Scaggsville Public Safety Complex (#11)	11226 Scaggsville Rd Laurel, MD	Y - washwater is directed to sanitary sewer	N
Schooley Mill Park Maintenance Shop	12975 Hall Shop Rd Highland, MD	N (washpad under design)	N
Utilities Maintenance Shop	8250 Old Montgomery Rd Columbia, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
West Friendship Fire Station (#3)	12535 Old Frederick Rd Sykesville, MD	Y - wash water is directed to sanitary sewer	N
Western Regional Park Maintenance Shop	15040 Carrs Mill Rd Woodbine, MD	N	N

County Wastewater Treatment Plant (LPWRP)
There were no spills reported to Maryland Department of the Environment (MDE) from July 1, 2017 through June 30, 2018.

There were 238,038,000 gallons of Reclaimed Water sent to the National Security Agency from July 1, 2017 through June 30, 2018.

Annual Inspections
Plant inspections for the SPCC Plan are completed on a monthly schedule. Any significant findings are reported to the Bureau of Environmental Services with corrective actions and follow-up correspondence. Each inspection is scanned and saved at LPWRP.

Plant inspections for the SWPPP are completed on a quarterly basis. All findings are recorded, and reports are sent to Environmental Services and saved at the LPWRP.

Pollution Prevention and Good Housekeeping Practices Training
For all industrial permits listed below, SWPPPs have been developed for each site and employees are trained annually, at minimum. Each year County staff is required to attend training which includes the SPCCs, the SWPPPs, IDDE and handling hazardous wastes. Training for FY18 was completed in January, February, and March 2018.. Personnel in the Police Department (702) and the Department of Fire and Rescue Services (1,114) received computer-based training. All other personnel (328) attended in-person training sessions.

The following inspections are conducted at the facilities covered by the industrial permits:

- Alpha Ridge Landfill
    - Weekly inspections of drainage areas which include un-stabilized landfill areas, active land application areas, material storage, and waste exposed to precipitation.
    - Monthly inspections of the rest of the drainage areas.
    - Quarterly facility inspections of the entire site.
    - Quarterly visual monitoring inspections of flow from each outfall. This was required to start in the first full quarter after the County was notified of coverage under 12-SW, which was the fourth quarter of calendar year 2015.

  - Quarterly Benchmark monitoring of the outfalls from drainage areas that call with Sector L: Landfill and Land Application Sites, and Sector C: Chemicals and Allied Products (the pilot composting facility). Benchmark monitoring was required to begin in the first full monitoring period six months after the County was notified of coverage under 12-SW, which was the second quarter of calendar year 2016.
  - Annual Comprehensive Site Compliance Evaluation (CSCE or Annual Inspection) of the entire site.
- All Other Sites
  - Quarterly facility inspections of the entire site.
  - Quarterly visual monitoring inspections of flow from each outfall.
  - Annual Comprehensive Site Compliance Evaluation (CSCE or Annual Inspection) of the entire site.

Reports of the inspections described above are included as narrative files included in the geodatabase.

Bureau of Highways (BOH)

The County shall report annually on the changes in any maintenance practices and the overall pollutant reductions resulting from the maintenance program. Within one year of permit issuance, an alternative maintenance program may be submitted for MDE approval indicating the activities to be undertaken and associated pollutant reductions.

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Bureau of Highways (BOH)

The Bureau of Highways (BOH) is responsible for addressing a number of issues concerning pavement, sidewalks, storm drains, and trees along more than 1,000 miles of County roads for the convenience and safety of the public. This work includes preservation efforts such as road crack-sealing and tree trimming, and remedial efforts such as County road snow removal and filling potholes. Some of the areas of operation that the BOH has focused on during the current permit year are described below.

Street Sweeping

The BOH has continued performing street sweeping with the assistance of a private contractor. Street sweeping occurs on 806 miles of the County's approximately 1,376 miles of curbed roadways. During the period of July 1, 2017 through June 30, 2018, the BOH collected approximately 718.57 tons of street debris via street sweeping. Each street is swept three to four times a year. Each sweeping cycle takes from six to nine weeks to complete. Cycles generally begin in the months of January, April, July and September. In general, each cycle begins in the east part of Howard County and moves westward.

Inlet and Pipe Cleaning

The BOH cleans and repairs storm drain inlets and pipes as needed or as complaints are reported. This work is performed throughout the year through the use of a recently purchased Vactor truck. Additionally, in the fall, the County removes leaf litter from storm drain inlets as needed.

Table 5: FY18 Inlet and Pipe Cleaning

Work Performed	Amount and units
No. of Inlet Repairs	35 ea.
No. of Inlet Cleaned	175 ea.
Amount of Debris from Inlet	180 tons
No. of Pipe Replacements	14 ea.
No. of Pipe Cleaned	83 ea.
Amount of Debris from Pipe	270 tons

Pesticides, Herbicides and Fertilizer

The County continues to minimize the amount of pesticides, herbicides and fertilizer used. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to control vegetation along the county's guard rails.

Table 6: FY18 Pesticides, Herbicides and Fertilizer

Herbicide Name	Amount and units
Oust	34.4 oz.
Glysophate	26.0 gal.
Pennant	13.0 gal.
Surfactant	25.80 quarts
Oust XP	2.55 lbs

Snow and Ice Removal

The BOH continues to utilize and update AVL and GIS technology to record where and when de-icing chemicals were applied on county roads during winter storm events. This minimizes the possibility of inadvertent multiple applications of deicing chemicals. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to for deicing the County's roads in FY18 during 13 events. According to the Baltimore, MD Snowfall data available from the National Weather Service Forecast Office for the Baltimore/Washington area, Howard County received approximately 15.4 inches of snowfall during the 2017-2018 winter season. MD Snowfall data are available online at:
http://www.weather.gov/media/lwx/climate/bwisnow.pdf.

Table 7: FY18 BOH Snow & Ice Removal Material

Highway Zone	Salt (tons)	Liquid Magnesium (gal)	Salt Brine (gal)
East	8310	5,500	19000
West	4482	2670	0
Central	5697	70	10997
Total:	18,489	8,240	29,997

Snow and Ice Removal Training
The BOH holds a Snow Rodeo event every October which Highway staff are required to participate. At this event staff use their skills to navigate through a course for them to drive a full-size snow plow through narrow pathways while missing all obstacles. In addition to missing obstacles the crews practice backing up without hitting a barrier, pushing a log into a designated slot. This event is a fun activity that also allows the County snow plow/salt truck drivers to hone their skills and make them more efficient during actual snow/ice events.

Department of Recreation and Parks (DRP)

Street Sweeping
The parking lot at Robinson Nature Center is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas. In FY18 we received support from Howard EcoWorks to complete significant maintenance of these rain gardens. The pervious concrete parking lot, green roof and rain gardens are also highlighted for visitors with interpretive signs.

Inlets Inspection and Cleaning
Zone 1 staff maintains a variety of inlets, storm drains, and swales within their respective sites. There are 40 storm drains that are located within Zone 1. The maintenance of the storm drains is painting, cleaning out, replacing hardware, and maintaining positive drainage. Staff spends roughly 30 hours per year on storm drain maintenance. Staff also maintains 10 inlets performing the following functions: removing invasive materials, maintaining a proper buffer zone, fixing any hardware issues, and litter/debris removal. This effort takes approximately 20 hours per year. Staff also maintains roughly 1,000 feet of swales through litter/debris removal, maintaining positive drainage, and routine trimming. This effort takes approximately 50 hours per year.

Zone 2 has spent 124 hours annually to inspect and clean forty-one inlets receiving drains to maintain stormwater systems on park land. Large inlets/stormwater pipe outflows are cleared by Department of Public Works, where the scope of work is beyond our capabilities.

The pond crew comes out annually to mow and remove the woody growth from the storm water pond area. Our staff conducts quarterly inspections, approximately 8 hours a year, to check for holes created by burrowing animals, and to ensure there is no evidence of run off from sediments.

Zone 4 spends an average of 120 hours per year (10 hours per month) on inlet inspection and maintenance at Rockburn Branch Park and a number of our other community parks. Troy Hill Park, with its addition of numerous bioretention ponds and swales throughout the most recent phases of construction have required over 400 man-hours of maintenance since this time last year. Maintenance on the bioretention structures at Troy Hill Park have been completed by County Park Maintenance Workers, contracted landscape professionals, as well as inmate work detail members from the Howard County Department of Corrections.

Pesticides, Herbicides and Fertilizer
The Park Operations Division will be incorporating a new turf management strategy for athletic fields and managed open space turfgrass. The 3-Tier liquid formulation that was used in years past proved to be very labor intensive and the product struggled to meet the usage demands of the facilities. Adhering to recommended fertilizer use requirements from Maryland Department of Agriculture, Park Managers will be tailoring custom management plans for individual fields based on soil analysis. By incorporating granular slow release nutrients that are dictated by analysis results, managers now have the flexibility to modify and limit inputs to precisely what is necessary for resilient turf. Rather than focusing on only macro-nutrient input, turf managers are working to

make naturally occurring nutrients in the soil available to the plant through the incorporation of humic acid and carbon content. The addition of humic and fluvic acids, derived from leonardite shale, help to chelate trace minerals present in the soil. Park Managers are also incorporating natural alternatives such as sea kelp extract, which has been shown to enhance root growth and strengthen drought tolerance.

These efforts will reduce our footprint on fossil fuel usage, equipment care and maintenance, man hours and subsequently reduce compaction of our soil structures while increasing water and oxygen infiltration to plant roots. A focus on continued efforts to maintain turf stands and reduce storm water erosion and runoff is being made. Howard County Parks has implemented and continues to use the latest technology and resources available to be a leader in conservation efforts to manage and protect our natural resources.

Zone 1 staff have relied on several cultural practices in order to reduce the pesticide applications. This strategy involves the following aspects: Increasing mowing height and frequency, overseeding with Certified seed mixes containing 0% weed seed, aerating, fertilizing and conditioning the soil to promote desired plant competition. Increasing the mowing height provides more shading and competition to the weed seedlings during the initial establishment phases. Fertilization, aeration, and quality seed selection contribute to the health and density of established turf, minimizing the opportunity for weed competition.

The selection and application timing of pre-emergent used this year was intended to limit pesticide usage as well. Dithiopyr, which has pre and post emergent qualities was applied in two reduced rate applications to allow for season long control, eliminating the need for a specific post emergent application. Post-emergent broadleaf applications are still a necessary component of the turf management plan in Zone 1, however these cultural practices assist in limiting rates and applications.

Zone 2 Pesticide usage has been reduced by 50% at community parks to include the usage of Glyphosate. Alternative organic solutions being tested by the Department of Agriculture to include acetate, a derivative of vinegar, this material is being sold on the market but has not been assigned a regulatory number by the Department of Agriculture. Problematic landscape beds were removed and landscape fabric was installed to reduce frequent herbicide applications.

Zone 3 researched the merits of pesticide free parks and has started a pilot study.

- Consultant was hired in 2013
- Pilot site had been selected: Dayton Oaks Park
- Site evaluation is in progress
- Methodology to be tested:
    - Freeze
    - Burn
    - Vinegar
    - Horticulture oil
- Zone 3 tested the freezing method for weed control at Dayton Oaks Park but found it be too cost prohibitive. The steaming method was also not effective. All methods were either cost or time consuming. We have returned to manually removing and spot spraying invasive weeds.

Zone 4 has reduced use of pesticides. The zone makes every effort to hand pull or trim weeds. When this is not feasible, we will spot spray. Pre- and post-emergent herbicides were included into Zone 4's turf management this year. While this marks a slight expansion of our pesticide usage, the rates at which we are applying these products are extremely low. By including these low concentration preventative products in a regular turf management plan,

we are able to avoid the necessity of using higher rates of such products in order to play "catch-up" with years of rampant rhizome development amongst undesirable species within our sports turf.

- Certified Pesticide Applicators attend yearly Pesticide Update run by the State.
- Certified Nutrient Applicators attend yearly Nutrient Update run by the State.
- Lead an "In-House" Pesticide Training for new employees and a refresher for others.
- Progressive in removing ash trees instead pesticide applications. Only historical value ash trees are being treated.

Snow and Ice Removal

Park Operations used motorized equipment, hand tools, and ice-melt materials to clear snow and ice from park roadways, pathways, ball courts, and school pathways. When possible, an organic corn-cob derivative product called "Dri-Zorb" is used in place of granular calcium chloride

School pathway deicing efforts have been handed over to one crew. This crew has been trained in the proper calibration of the equipment used. The formation of this crew has reduced wasted materials as there is one sole group focused on all the areas and they are able to monitor the walks more closely and effectively which maximizes efficiency.

Pollution Prevention and Good Housekeeping Practices

- All Park Operations maintenance shops adhere to all standards regarding hazardous material handling and spill response. Staff conduct regular inspections of material storage and spill remediation. This is intended to identify and improve social, economic, and environmental impacts. Adherences to these standards help prevent the release of hazardous material into the environment.
- All park staff has attended annual training this year to help them towards their goals of being more aware in pollution elimination and water runoff. Some of these trainings include: Trail maintenance workshops, Hazmat training, and Annual Storm Water Pollution Prevention Training.
- Centennial Maintenance Shop has installed four spill clean-up stations to collect fluid spills from equipment leaks and fluid fill areas. Vehicles are equipped with small fluid spill kits for spills that could potentially occur during transport of small fluid containers. A monthly SWPPP report is filed with the Waste Management Division. 1,000 pounds of spill waste has been collected and removed from the Maintenance Shop since implementing the stations. (Note- this total reflects a 750-pound reduction in the spill waste from previous year.)
- Vehicles and equipment are cleaned off site at designated facilities equipped with wash bays reducing runoff from park operation maintenance sites.
- SWPPP are in place for the Schooley Mill Park and Western Regional Parks Maintenance Facilities. This is a monthly inspection/report to monitor water runoff from the maintenance yards. This also includes yearly inspection on the condition of the sediment ponds affiliated with these maintenance yards.
- SWPP (Storm Water Protection Plan) is in place to ensure that run-off around Rockburn's maintenance shop is eliminated. The plan was created by Environmental Services who conduct inspections 2 times a year and trains staff on proper protocols for maintenance and vehicle cleaning.
- The Zone cleans paint machines in proper locations, we use turf carts vs trucks whenever possible, we clean all spills properly and use pig mats when we are aware of machine leaks. Our staff fuels all equipment inside as well.
- Attends yearly Site Environmental workshop
- Adheres to all standards regarding hazardous material handling and spill response. Regular inspections of material storage and spill remediation are conducted though Clean Harbors. This is intended to identify and

improve social, economic, and environmental impacts. Adherences to these standards help prevent the release of hazardous material into the environment.

6. Public Education

Howard County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:

a. Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Provide information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);
vi. Residential car care and washing; and
vii. Proper pet waste management.

c. Provide information regarding the following water quality issues to the regulated community when requested:

i. NPDES permitting requirements;
ii. Pollution prevention plan development;
iii. Proper housekeeping; and
iv. Spill prevention and response.

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Compliance Hotline

The Howard County website posts a Hotline number, (410) 313-6447, which visitors can call to reach the Bureau of Environmental Services. Managers and inspectors responsible for the County's IDDE program respond to these calls within 24 hours, Monday through Friday. Complaints that come in during the weekend are referred to 911 or the 24 hour MDE Spill Hotline at (866) 633-4686.

Complaints include but are not limited to illicit discharges, dumping and spills. All complaints are kept in a database. The County website also hosts an illicit discharge form that visitors can fill out and send directly to the manager of the IDDE Program. In addition, the County also is part of Tell HoCo, a SeeClickFix, smartphone application that allows anyone in Howard County to report an illicit discharge directly to the IDDE Manager.

Increasing Water Conservation

Robinson Nature Center

The Robinson Nature Center, in operation since September 2011, serves as a model of innovative water conservation methods and officially received its LEED Platinum certification by the USGBC in 2012. Innovative water conservation methods incorporated into the building and property include:

- Porous Paving in the parking lot
- Geothermal HVAC heating and cooling system that utilizes rain water collected in tanks underneath the Porous Paving in the parking lot
- Contracted for Green Power
- Green Roof technology
- Efficient Landscapes including four rain gardens that incorporate native plantings
- Water use reduction using waterless urinals and high efficiency toilets and faucets
- In FY18 more than 100 native perennials and grasses were planted and mulched and will continue filtering runoff pollution, recharging local groundwater and improving water quality throughout the Middle Patuxent watershed.
- Native plantings continue to be incorporated throughout the property, including in the center's backyard demonstration area that serves as an educational display for residents. Existing native plantings continue to be monitored, maintained through regular volunteer weeding events and replaced as needed when predation occurs. These plantings reduce the need for irrigation, pesticides, herbicides, etc., while providing a habitat for wildlife.
- Working with local nurseries and volunteers, the center planted almost 150 new native trees and shrubs along hillsides and surrounding portions of the trail to further enhance soil stabilization in these areas.
- Storm drains located along the Cedar Lane entrance of the Nature Center had "Chesapeake Bay Drainage" stenciled onto them, thus educating visitors about the importance of proper disposal of pollutants that could affect local waterways and wildlife.
- Since 2012, the Nature Center has participated as a host site for "Project Clean Stream", a Baltimore regional stream and watershed clean-up effort. In FY2018, invasive plant species including, Autumn Olive, Oriental Bittersweet, Wineberry, Multi-flora Rose, and Japanese Honeysuckle were targeted. Volunteers cleared said species and allowed the opportunity for reforestation plantings to occur.
- Using the building as a teaching tool – the Robinson Nature Center facility educates the public about green technologies, sustainability, environmental stewardship and techniques that can help reduce stormwater runoff, as well as reducing water and energy consumption:
- Stormwater mitigation is achieved on the property through a pervious concrete parking lot, four separate bioretention/rain gardens and a green roof. These items are highlighted on our LEED tours which we offer by group reservation as well as during special events throughout the year. The parking lot is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas. In FY18 we received support from Howard EcoWorks to complete significant maintenance of these rain gardens. The pervious concrete parking lot, green roof and rain gardens are also highlighted for visitors with interpretive signs.
- Interpretive signage in the building and on the center's grounds describe to visitors how different features reduce the environmental impact of the building by mitigating stormwater run-off and minimizing water and electricity use.
- A backyard demonstration area shows the public what they can do on their own properties to improve the management of water. Rain barrels demonstrate catchment of water for use in the garden and native plants demonstrate low-maintenance landscaping.

- The Chesapeake Bay exhibit (one of three permanent exhibits in the building) educates the public about water quality issues. A scaled reproduction of the Bay covering the floor of the exhibit allows visitors to walk the connections between Howard County and the Bay. Through interactive displays, visitors learn about the plight of oysters, how products they use can contribute to storm water runoff issues and how they can help save the Bay.
- A touch tank filled with sea creatures is in our Children's Discovery room. This tank serves as an extension to our Chesapeake Bay exhibit and further demonstrates how bodies of water are connected. Our educators and volunteers interpret the dependence of aquatic animals on our land use decisions that affect the quality of their habitat. Extensions of these concepts are also shared through docent carts through which volunteers discuss oysters and horseshoe crabs, two prominent species, in the Chesapeake Bay.
- In FY2018, Robinson Nature Center hosted over 35,000 visitors through the building.

Environmental Quality Incentives Program (EQIP)
The USDA, NRCS continued to work with the HSCD to administer EQIP, the main conservation cost-share program available to farmers and farm owners from the federal agriculture department. The following practices were installed in the County through this program:

(1) 2160 square feet High Tunnel
(3) 4 acre Forage and Biomass Planting
(17) 31,122 linear feet Fencing
(2) 8 acre Prescribed Grazing

Conservation Reserve Enhancement Program (CREP)
The USDA continued to work with HSCD to administer CREP, a streamside buffer cost-share program available to farmers and farm owners from the federal agriculture department.

(1) 2.8 acres Riparian Forested Buffer

Practices Completed with State or Local Cost Share or Without Cost Share Assistance
These practices were completed with technical assistance from the HSCD. Some projects received cost sharing from either Maryland Agriculture and Water Quality Cost Share (MACS) program or Patuxent Reservoirs Watershed Protection Group local cost-share program while other practices received no cost-share.

(4) 6 each Watering Facility
(2) 0.3 acre Heavy Use Area
(4) 1378 feet Livestock Pipeline
(1) 1904 linear feet Fencing
(1) 1 each Sediment Control Pond

Conservation Planning
In providing technical assistance, the HSCD writes conservation plans. Plans are also written for land that is proposed for the agricultural land preservation program. Also, existing preservation parcels have conservation plans that may be updated. There were 27 new conservation plans on 3647.1 acres and 7 revised conservation plans on 880.7 acres written by the HSCD office.

Environmental Stewardship
In partnership with the National Security Agency (NSA) and Howard County LPWRP, highly treated wastewater is diverted and utilized as cooling water for national security technology. Much of the water will be evaporated during the cooling process.

Additionally, new discussions have begun with other industrial facilities to utilize reclaimed water for process use which would replace potable water.

A carbon-neutral power backup system was created at the Plant, which includes the combination of solar panels and diesel generators to ensure the Plant operates in all weather conditions and avoids potential overflows.

LPWRP personnel attend the Howard County Fair to hand out information on the treatment plant and on how to keep the sewers from getting clogged and causing overflows. This information includes proper disposal of grease, which is a consistent cause of sewer flow issues.

Stormwater Management – A study was conducted to determine the cause of deterioration of three stormwater outfalls at the LPWRP along the Little Patuxent River. Out of the study a project was started to rehabilitate the three outfalls and alleviate flooding. The design was completed in December 2016. The project was broken into two phases due to timing and stream closure. Phase 1 included the rehabilitation of Outfalls E and F and was completed in February 2017. Phase 2, which was completed January 2018, included raising three outfalls so that they are no longer underneath the baseflow of the Little Patuxent River and installing two trench drains along Perimeter Road to promote drainage into the Little Patuxent during storm events.

Residential and Community Stormwater Management Implementation and Facility Maintenance

Rain Barrel Program

The SWMD continues to provide residents with free barrels through the County's Rain Barrel Program. Pre-drilled rain barrels are available free of charge to residents who attend seminars at the Alpha Ridge landfill. Residents purchase the hardware needed and the Master Gardeners provide free instruction on how to assemble the rain barrels. In FY18, Howard County gave away 76 rain barrels to residents through workshops held at the Alpha Ridge Landfill. The County also provided 24 free rain barrels to residents at GreenFest.

Residential Pool Discharge

Howard County mailed out two letters to residential pool owners advising them of the requirements for draining pools (correct pH, drain slowly, and lower disinfection levels to less than 0.40 mg/L).

Middle Patuxent Environmental Area (MPEA)

- The MPEA Integrated Natural Resources Management Plan for the 1,021-acre environmental area was initially drafted in June 2000, and was last updated in January 2018. The plan outlines strategies, techniques and protocols for environmental education, research, recreation, natural resources management and administration. The plan is updated annually.
- The implementation of the plan's projects and programs in FY2018 has included the following accomplishments:
- 971 volunteer hours were spent maintaining 5 ½ miles of trails, conducting wildlife and stream surveys, controlling invasive exotic vegetation, planting native trees and shrubs and assisting with the managed deer hunts in the MPEA.
- Implementation of the MPEA Woodcock Habitat Management Plan to restore breeding habitat for American woodcock and other early-successional species within the Middle Patuxent River watershed continued as an ongoing project in FY2018. In spring 2018, an additional acre of non-native, invasive autumn olive was restored to native early successional habitat to benefit woodcock and other meadow/shrub-scrub species. A transitional edge shrub border was planted in this new meadow, and the

area was reseeded with a mix of native grasses and wildflowers. Maintenance will include invasive species control, reseeding of any bare patches, and winter meadow mowing.

- A donation in the amount of $1,912.50 from the Howard County Bird Club funded 50% of the project costs for the above-mentioned habitat restoration project, including the forestry mulcher/tiller contractor, meadow seed mix, and the planting of 42 trees and shrubs. An additional 95 trees were planted the previous fall for a total of 137 trees planted in MPEA in FY2018.
- The MPEA Independent Trail Maintenance Team volunteer program contributed 256 hours in FY2018, with much of the time being spent on the installation and maintenance of drainage and erosion control structures. Check dams and water bars were installed and maintained along trails through riparian areas where trail erosion was evident.
- Between the Conservation Stewardship and the Weed Warriors programs, a total of 634 volunteer hours were contributed to the removal of non-native, invasive plant species and replanting of native trees and shrubs within the environmental area.
- MPEA staff and Conservation Stewardship Program volunteers worked to maintain native tree and shrub planting sites from previous seasons. Tree shelter maintenance, invasive removal and monitoring was conducted on 2,144 native trees and shrubs previously planted in MPEA stream buffers and upland habitats.
- MPEA staff completed a systematic evaluation of all 35 storm drain outfalls within the environmental area in 2010, and in 2011 an additional 38 storm drain outfalls outside but impacting the area were inspected. Outfalls were placed into severity rating categories as follows: 1 – fairly good (about 50%), 2 – slight to moderate erosion (17%), 3 – slight to moderate erosion with severe stream bank erosion downstream (14%), 4 – moderate to severe erosion; unstable; some impact to infrastructure (14%), 5 – infrastructure damaged/under repair (5%). During the evaluation, one storm drain outfall with severe erosion and infrastructure damage was referred to the Storm Water Management Division and was repaired in 2012 using a regenerative stormwater conveyance design. This project now serves as a demonstration site for innovation in SWM techniques. In 2013, MPEA staff trained volunteers from the Middle Patuxent Environmental Foundation to repeat the original storm drain outfall surveys. 2013 data was compared to the baseline data from 2010 in order to monitor whether the outfalls were stable or if the erosion was progressing and to recommend actions to minimize future erosion. In FY2018, MPEA staff continued to monitor SDO's for erosion, as well as monitoring the two repaired SDO's at New Country Lane and Great Oak Way for function, tree planting success, and invasive species control.
- A volunteer from the Howard County Legacy Leadership Institute for the Environment (HoLLIE) completed work on conducting macroinvertebrate stream surveys on all 17 tributaries and the main stem of the Middle Patuxent River within the MPEA in 2011. In 2012, a subsequent volunteer continued work on the project with data analysis and creation of a PowerPoint presentation on the results, plus a synopsis of the Middle Patuxent Watershed's scope, stakeholders and education and monitoring strategies. In 2013, a Watershed Stewards Academy graduate used this data in a public presentation, entitled "Slow the Flow", at the Robinson Nature Center. In FY2018, MPEA volunteers continued to build on previous work with ongoing stream monitoring and stream habitat assessments, and are building towards greater outreach to neighborhoods and HOAs.
- Researcher Dr. Sonja Scheffer, from the USDA Systematic Entomology Lab, conducted insect sampling in riparian and upland habitats in MPEA in order to identify and catalog insect fauna and also to provide volunteers with educational experiences relating to entomology, scientific identification methods, insect curation and natural history. A reference collection of curated insect specimens is being created from this project.

Howard EcoWorks (A green jobs training and environmental stewardship program)
Howard EcoWorks has continued to install stormwater BMPs and engage the public in fee for service maintenance. The maintenance program includes letters to past customers who have installed rain gardens, explaining the importance of maintaining them to preserve functionality. Howard EcoWorks maintained, for a fee, rain gardens and bioretention units on 18 different private properties. Howard EcoWorks installed six new rain gardens and two conservation landscapes on private residential properties and educated the owners about their purpose, function, and maintenance.

Howard EcoWorks Program Participants constitute 31 young persons who increased their understanding of stormwater principles through participation in the program.

Howard EcoWorks provided five outreach events to the public through which they provided education to 90 citizens about the how and why to slow stormwater flows.

Commercial/Non-residential

Commercial Credit and Reimbursement Program
During this time period, the Office of Community Sustainability continued the commercial credit and reimbursement program. Eligible property owners were awarded a credit against the Watershed Protection Fee for on-site stormwater management. Before the July 2018 Fee was issued, 69 commercial properties had been approved for credit. There have been no commercial reimbursements granted to date.

Commercial Stormwater Solutions Work Group
In the spring of 2016 the Howard County Executive formed a work group of commercial property owners, consulting engineers, commercial property managers, and the University of Maryland Environmental Financing Center. Staff is working to accomplish and/or pilot some of the recommendations of the 2016 Commercial Stormwater Work Group. During this time period, the County partnered with Wal-Mart in Ellicott City to perform a stormwater pond retrofit to be completed in July 2018. Wal-Mart contributed almost ¼ of the costs toward the project.

Non-Profits

Watershed Protection Partnership
During this period, the Office of Community Sustainability continued the Non-Profit Watershed Protection Partnership (NPWPP). In this Partnership, the County grants a 100% credit to non-profits in exchange for the ability to assess for and implement stormwater management projects on their properties. This program not only accomplishes impervious surface management, but also involves key stakeholders in the stormwater remediation problem, thus increasing public buy-in. There are 232 parcels in the NPWPP, which totaled to approximately $324,000 of Watershed Protection Fee credits during fiscal year 2018. While the number of Partners increased slightly, the credit amount is lower due to the legislation that capped the Fee for all nonresidential properties at a decreasing percentage down to 10% in FY18.

Two contractors were hired to perform site assessments, designs, and installations of stormwater management practices on NPWPP property. These contractors were instructed to perform the maximum amount of impervious treatment possible for the total available funding of $2 million, $1 million of which was furnished by an external grant. One contractor performed a large stream restoration for approximately 22 impervious acres of credit. The other contractor installed 3 stormwater pond retrofits at Howard County General Hospital, First Evangelical Lutheran Church, and Liberty Baptist Church to achieve approximately 16.6

acres of impervious area credit. All of the projects were completed in FY18 and the contractors will continue functional maintenance of the sites for 5 years.

Residential

CleanScapes

Since an estimated 40% of impervious surface in Howard County is located on residential properties, a residential stormwater program was created. The CleanScapes program, administered by the Office of Community Sustainability, offers County residents reimbursement for installation of stormwater Best Management Practices (BMPs) and credit toward the Watershed Protection Fee. During fiscal year 2018, $20,024 in reimbursements were granted to 38 residents. At the end of fiscal year 2018, a total of $3,065 was credited to 144 residents. The CleanScapes program also includes periodic public events and promotional materials to improve public education and buy-in. By the end of fiscal year 2018, approximately 4.7 acres of impervious surface were treated by stormwater BMPs on residential lots through the CleanScapes program.

CleanScapes Communities & Rain Gardens for Clean Water

The CleanScapes Communities pilot program was developed to increase the number and geographic diversity of residential stormwater BMPs in the County. The pilot program targeted a specific watershed, outside of the Columbia Association since incentive programs for these residents were already established. The program was developed utilizing residential input in a Chesapeake Bay Trust-funded focus group and mimicking elements of successful residential stormwater programs.

Two contractors were hired to install rain gardens and rain barrels on residential property utilizing watershed protection funds and a grant from the National Fish and Wildlife Foundation (NFWF). Several elements were adopted to minimize barriers to homeowner BMP implementation including: high subsidy of Best Management Practices (75% covered up-front by Fee funds and NFWF grant), County provision of qualified contractors to install BMPs for homeowners, personal consultations and customized BMP designs for homeowners, provision of maintenance tips and packages to homeowners, plant and structural guarantees for BMPS through the contractors, and complete subsidy of BMPs for low-income homeowners. Contractors were also responsible for educating homeowners on the function and impact of the installed stormwater BMPs, increasing public education on stormwater management. Preliminary results indicate strong, positive changes in homeowner knowledge and attitude toward stormwater management after participation in this program, as well as a desire to engage in other stormwater-mitigating practices on their properties. One of the contractors hired for the CleanScapes Communities project had never performed work on residential properties, encouraging the growth of the residential BMP field.

At the completion of the project 28 rain gardens and six rain barrels were installed through the program. One garden was installed for a low-income resident at no cost. The rain gardens and rain barrels that were installed treat 38,177 square feet (0.88 acres) of impervious surfaces, with an average of 1,247 square feet of impervious treatment per rain garden. The project was also able to reach many individuals (10,263) through education and outreach activities and the social marketing plan created in partnership with the Alliance for the Chesapeake Bay and READY (READY has moved from management by the Alliance for the Chesapeake Bay to management by a Howard County non-profit known as Howard EcoWorks).

Because of the project's success, it was renamed and adopted as the Rain Gardens for Clean Water program where it was expanded to the entire county (except Columbia Association properties since they already have a similar program available to their residents) for FY18 with $50,000 in funding. Through this funding, 11 gardens and one rain barrel were installed treating a total of .36 acres of impervious surfaces on residential

properties. With a high level of homeowner interest in the program, $60,000 in funding has been allocated to continue the program in FY19.

Septic Savers

The Office of Community Sustainability (OCS) coordinated with the Health Department, Bureau of Utilities and the staff at the water treatment plant to develop the Septic Savers Program that promotes proper septic maintenance. Residents can go to the County's website to learn about the benefits of properly maintaining their septic tanks and can request a $100 reimbursement when they pump their septic tank every 3-5 years. Septage hauling records from the treatment plant are used to verify the residents' request for reimbursement. During FY18, 1,197 residents received the reimbursement. OCS also partnered with the University of Maryland Sea Grant Extension and the Howard County Health Department to offer free educational septic workshops to inform residents about how and why to care for their septic systems beyond pumping them out. Workshops were held at the Gary J. Arthur Community Center in Cooksville on March 23 and April 13, 2017. More information about the Septic Savers Program can be found on the County's website: https://www.cleanwaterhoward.com/what-is-your-role/residential-properties/septicsavers

Proper Erosion and Sediment Control Practices

Construction Inspection Division

The Construction Inspection Division (CID) responds to citizen complaints as they relate to development projects under construction. Often times when addressing citizen complaints, it becomes a public education opportunity describing the situation and BMP practices used to address their concerns as they relate to stormwater are explained.

Soil Conservation District

When county residents who reside on private property are having issues with erosion and/or drainage, the Soil Conservation District staff is contacted. A District staff member will meet with the resident to review the issues and consider options. The District will then put together a recommendation report for the resident with recommendations to repair and prevent additional erosion or drainage issues.

Increasing Proper Disposal of Household Hazardous Waste

The County provides a multifaceted approach to proper management and diversion of household generated hazardous waste. These includes a brochure and web page highlighting what is accepted at the County's permanent drop off program at Alpha Ridge Landfill Resident's Convenience Center, along with ways to minimize through safe alternative products other than standard household chemicals. Brochures are available at County buildings and libraries. During the reporting period over 538,000 pounds of hazardous waste was collected from over 10,000 residents at the Alpha Ridge Landfill Resident's Convenience Center.

Improving Lawn Care and Landscape Management

Stream ReLeaf

The Stream ReLeaf Program was initiated by the Howard County Stormwater Management Division (Department of Public Works) in 2003 as part of the implementation of the Little Patuxent River Watershed Restoration Action Strategy. The Program has grown and expanded in scope significantly over the years, and is now managed by the Natural Resources Division of the Department of Recreation and Parks.

Stream ReLeaf is a program designed to enhance riparian (stream) buffers by providing free native trees and shrubs to homeowners. The homeowner commits to planting the trees and shrubs on their property and the County delivers the requested plants. Requirements for the program are as follows: the area that the homeowner is willing to plant must be within 75 feet of a stream (right of ways are not eligible); and the homeowner must commit to planting at least 12 trees. Past performance is presented in the table below.

Table 8: Stream ReLeaf Summary

Year	Number of Participants	Number of Trees Planted
CY 2003	8	103
CY 2004	15	468
CY 2005[1]	1	150
CY 2006	37	1,374
CY 2007	31	1,208
CY 2008[2]	28	709
CY 2009	25	1,908
CY 2010[3]	11	367
CY 2011	81	1,780
CY 2012	32	1,166
CY 2013	69	2,353
CY2014	55	2,281
CY2015- FY2016	32	1150
FY2017	13	700
FY2018	9	479
Total	**438**	**16,196**

[1]Program not staffed.
[2]Some '08 plantings rescheduled for Spring '09.
[3]Some '10 plantings rescheduled for Spring '11.

Turf to Trees

The Turf to Trees program was created in 2016 and is a partnership between the Department of Recreation and Parks and the Office of Community Sustainability. The goal of the program is to aid property owners of lots sized 1.5 to 10 acres with little canopy coverage to convert lawn to forest. The Department of Recreation and Parks meets with interested homeowners to create a planting plan, species list and map out the boundaries of the planting. The County provides the trees and planting labor to qualifying homeowners free of cost. The homeowner must commit to the maintenance of the trees.

Table 9: Turf to Trees Summary

Year	Number of Participants	Number of Trees Planted
FY2017	16	2,062
FY2018	14	1,264
Total	**30**	**3,326**

*FY2016- Fall only

Compost Demonstration Program & Compost bin give-away

Howard County Master Gardeners held free compost demonstrations and lessons throughout the County, attendees were instructed on how to create and manage their own backyard compost piles. Howard County's Recycling Division provides free compost bins to residents at these demonstrations, and additionally makes them available for pickup at the Alpha Ridge Landfill Resident's Convenience Center and the Bureau of Environmental Services office in Columbia. Approximately 450 compost bins were distributed in 2018. Additionally, staff at Robinson Nature Center, Roger Carter Community Center and Miller Library actively compost food scraps generated by staff.

Residential Car Care and Washing

Public Education

Residential car care and car washing topics are included in presentations to the public and outreach activities to schools. The County has spoken to the Howard County Public Schools regarding the car wash fundraisers that were being done by many schools. An explanation of the IDDE program and what they can and cannot enter the storm drain system was provided and in general school car wash fundraisers have stopped.

Proper Pet Waste Management

The Bark Ranger Program

In the summer of 2013, the Park Rangers of Howard County Recreation and Parks implemented a new initiative program. "Bark Ranger" encourages patrons to clean up after their pets, more specifically dogs, and to use a leash while visiting a Howard County park. Dog feces not picked up is unsightly and negatively impacts our ground and surface water, and attracts rodents. It is important to keep your dog on a leash. Not only is it the law but it is being considerate to the other park patrons. We encourage you and your pooch to take the pledge and be committed to protecting our environment. Currently the program has 3,529 participants signed up that have taken the Bark Ranger pledge:

My Human and I care about our environment and the safety of others around us.
We pledge to do our "doodie" and clean up after ourselves.
I will remain on my leash by my Human's side at all times.

As part of the Bark Ranger pledge, participants receive a Bark Ranger cloth bandana and a plastic bone which contains baggies to remove pet excrement. Through this initiative, visitors of Howard County Recreation and Parks facilities are made aware of the negative environmental impact that pet feces have. Through this interpretation, those who participate, are appreciated for the "dirty jobs" of pet-ownership and rewarded with a small token.

Information Provided to the Regulated Community

The County provides various stormwater quality to the regulated community related to:

- NPDES Permitting Requirements
- Pollution Prevention Plan Development
- Proper Housekeeping
- Spill Prevention and Response

This information is provided when requested, through presentations, mailings, telephone conversation and one-on-one discussions in person.

Other Public Outreach and Education:

Stream Mapper -

The Office of Community Sustainability's contractors developed a stream monitoring app, the Stream Mapper, and a new user-friendly website, www.streammapper.org for data collected by app users. The website also provides education about watersheds and water quality. This app encourages County residents to visit local streams and collect basic information indicating stream health. This app not only encourages the public to become invested in local stream health, but has helped the County to detect and fix a sewer leak and a loose manhole. One local group used the app to find a trash cleanup site, resulting in the removal of 3,700 pounds of trash. Several local groups and projects utilize the stream mapper including: the Howard County Watershed Report Card Project, the Howard County Watershed Stewards Academy, Patapsco Heritage Greenway, the Howard County Sierra Club, and Howard Community College. To date, the app has 630 users and 296 reports. We are currently looking into making updates to the app that will improve functionality and promote a better experience for users.

Storm Drain Stenciling

The Office of Community Sustainability developed a storm drain stencil with a local message, "Only Rain Down the Drain: Drains to Patuxent River/Patapsco River" to remind residents that materials dumped in storm drains will result in degradation of local water bodies. To date, over 375 drains have been stenciled by local groups including: homeowners associations, Eagle Scouts, Boy Scouts, Girl Scouts, Howard Community College, Howard County Public Schools, Howard County Watershed Stewards Academy, Baltimore Aircoil Company, and the READY program. The message itself will remind passersby not to pollute, but has also educated the volunteers stenciling the drains and the communities witnessing the projects.

Community Groups

The Office of Community Sustainability participates in several groups which educate the public about stormwater management, most prominently: the Howard County Watershed Stewards Academy (WSA), the Watershed Improvement Network (WIN), the Howard County Earth Forum, the Watershed Report Card Program, the Maryland Association of Floodplain and Stormwater Managers (MAFSM), the Sierra Club, and Transition Howard County.

Health Department

The Howard County Health Department continues to maintain information on its webpage noting that old prescriptions and medicines should not be poured down the drain or flushed since it may negatively affect the quality of streams, waterways, and the Bay. As part of the on-going Bay Restoration Fund (BRF) grant program, the Health Department is identifying and inspecting qualifying properties with failing septic systems, coordinating the connecting of qualifying homes currently on septic systems within the Metropolitan District, and also evaluating system upgrades for acceptance into the grant program. State legislation effective November 2016, enables non-critical area counties (including Howard) the ability to exercise flexibility in requiring BAT units for all new construction. This flexibility has helped enable a better targeted application of BRF funding, while leaving in place public health priorities. This has also corresponded to a reduction of BAT unit installations in the county since that time. The current grant award of $192,000 is through June 2018. The completion of upgrades to most major Wastewater Treatment Plants is now complete, which means that additional funding beginning in FY 2018 will be available for stormwater, combined sewer systems remediation and potentially BRF funding for septic systems. Proposals to MDE will be prioritized upon readiness to proceed, benefit to the public and groundwater. MDE, through HB12 legislation, has established criteria for additional funding criteria to cover administrative costs of the BRF program for each county based upon county agreed to levels of support. Howard County has secured funding through FY 2018 for level 1 support ($30,000 each year). Future renewals and/or supplemental funding will be based upon established criteria and available funding distributed by MDE.

E. Restoration Plans and Total Maximum Daily Loads

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).

Howard County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within Howard County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.

1. Watershed Assessments

a. By the end of the permit term, Howard County shall complete detailed watershed assessments for the entire County. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement, provided the assessments include all of the items listed in PART IV.E.1.b. below. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality analysis.

b. Watershed assessments by the County shall:

I. Determine current water quality conditions;
II. Include the results of a visual watershed inspection;
III. Identify and rank water quality problems;
IV. Prioritize all structural and nonstructural water quality improvement projects; and
V. Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.

Annual Update Number 23 Status

Under Howard County's current MS4 permit (Part IV.E.1), the County is required to develop Watershed Assessments to assess current conditions and to identify restoration opportunities to address pollutant reductions in approved TMDLs. In accordance with this requirement, Howard County's SWMD sponsored assessments of the Little Patuxent and Middle Patuxent Watersheds in 2015 which were reported on in AR20. In 2016 the County completed assessments in the Patuxent watersheds (Brighton Dam, Patuxent River Upper, and Rocky Gorge Dam) and the Patapsco watersheds (Patapsco River Lower North Branch, Patapsco River South Branch) thereby completing assessments of all of the County's watersheds. The County scheduled public meetings in late January of 2017 to introduce the assessment results and provide the assessments for a 30-day comment period. No comments were received. The County continues to perform restoration projects from the Watershed Assessments as projects that will provide water quality improvement and impervious area surface restoration.

2. Restoration Plans

a. Within one year of permit issuance, Howard County shall submit an impervious surface area assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, Jun. 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.

By the end of this permit term, Howard County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the 2000 Maryland Stormwater Design Manual. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

b. Within one year of permit issuance, Howard County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Howard County shall:

I. Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;

II. Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;

III. Evaluate and track the implementation of restoration plans through monitoring or modeling to document the progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and

IV. Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County's watershed assessments.

Annual Update Number 23 Status

To meet the requirements under section IV.E Restoration Plans and Total Maximum Daily Loads, Howard County developed several related projects in 2015-2016. First are the watershed assessments conducted in the Little Patuxent and Middle Patuxent watersheds (2015) and the assessments for the Patuxent and Patapsco watersheds (2016) which were described in previous annual reports. The Countywide Implementation Strategy, or CIS, was developed in 2015 as the County's overall Restoration Plan. The County updated the CIS in December of 2017 based on MDE comments, the County's approved impervious baseline, updates to the County's programs and strategies, and County progress made through FY17.

The CIS included three major elements:

1. Impervious Area Assessment – to set the County's total jurisdictional impervious area, the total treated impervious area, the baseline untreated impervious area, and the 20% restoration target.
2. Impervious Area Restoration – the CIS establishes the current progress and the planned project and programs needed to meet the impervious restoration by the end of the permit in December 2019.
3. TMDL Restoration – the CIS establishes the current progress and the planned project and programs needed to meet the County's stormwater wasteload allocation (SW-WLAs) with cost, schedule, and final dates for meeting each required reduction.

The CIS is not updated and resubmitted with this FY18 annual report. Instead a series of reports were developed by the County that present the analysis and progress reporting completed in the FY18 reporting cycle. Those reports are summarized below and are included as attached narrative files to the County's AR23 submittal.

Impervious Area Assessment

As a requirement of section PART IV.E.2.a of the NPDES MS4 Discharge Permit issued by MDE to Howard County, the County must conduct an impervious area assessment to define the restoration efforts required under the permit to restore 20% of remaining Countywide baseline impervious acres not already restored to the MEP. The restoration is required to be complete by December 2019, the end of the current permit term.

Howard County first conducted its baseline impervious accounting analysis and reported on the methods and results in the Countywide Implementation Strategy (CIS) completed in December 2015. The CIS was submitted to MDE with the County's NPDES annual report (AR20). Howard County made edits to the analysis based on MDE's comments on the County's methodology and submitted an updated version in December of 2016 with its annual report (AR21). Changes included a revised date for determining restoration projects credited towards baseline reduction versus restoration, additional County data resources being further prepared, and basic progress completed during FY2016. MDE reviewed the County's impervious area assessment submitted in December 2016 and provided comments and an approved impervious area baseline on April 13, 2017. Revisions to the County's impervious baseline accounting following MDE's approval were provided and discussed in an additional version of the accounting document in December 2017 submitted with the County's annual report (AR22).

As part of the impervious area accounting and restoration process, MDE has allowed for each Phase I MS4 municipality to submit an updated and revised impervious baseline in year 4 of the current permit, which for Howard County is 2018. The revised baseline can include changes related to newly documented BMPs, updates to restoration BMP crediting, and improvements in the supporting GIS data and databases. In addition, the County is proposing revisions to its Municipal Separate Storm Sewer System (MS4) area; which, in turn, will affect impervious baseline accounting calculations. A detailed description of the datasets and analysis used to delineate a refined MS4 area are included in a report (Howard County MS4 Area Revision Methodology and Results, December 2018) prepared and submitted to MDE with this FY2018 Annual Report (AR23) (McCormick Taylor, 2018).

As described in the report the two primary factors that Howard County has accounted for in the MS4 area revision process are ownership and operation of the stormwater system, and stormwater drainage and pass through. To define the Howard County MS4 area, State and federal properties are excluded from the County's responsibility. Additionally, industrial facilities with NPDES permits are also excluded. Howard County has included the Census Urbanized Area, County owned property and roadway right of way, and those areas that drain to and through the County's currently mapped stormwater system including outfalls, stormdrain infrastructure, and stormwater BMPs. At this stage, the County has elected to include drainage to stormwater BMPs that are under private

ownership and operation, but reserves the right in the future to exclude these areas if they do not drain to County owned or operated stormwater infrastructure.

Howard County has selected a conservative method to delineate a refined MS4 area that includes areas that it could justifiably exclude. The MS4 area as described in this report is the area used to establish the impervious area baseline for setting the County's 20% restoration goal. Per MDE guidance, the baseline accounting is set to a 2002 date, wherein areas developed post-2002 are deemed fully treated based on implemented stormwater regulations requiring treatment of at least 1-inch of stormwater runoff. Therefore, when establishing the 2002 conditions under this revised MS4 area, parcels with development dates after 2002 were excluded.

The County will continue to provide stormwater services Countywide and will implement its stormwater programs in a similar manner. MS4 permit conditions under items IV.C Source Identification, IV.D. Management Programs, IV.F Assessment of Controls, and IV.G Program Funding will continue to be implemented Countywide.

The MS4 area revision resulted in a new calculated MS4 impervious area of 13,775.7 acres. The County also updated its impervious baseline accounting in which County treatment and restoration practices completed prior to the MDE recommended date of 6/20/2010 is applied as baseline treatment. The results yielded an Impervious Baseline Untreated value of 10,042.0 acres and a 20% Restoration Target of 2,008.4 acres (KCI, 2018). A summary of the assessment per watershed is presented in Table 10.

Table 10: Impervious Area Assessment Summary in Acres

Watershed	Total Impervious Area	County MS4 Impervious Area	Impervious Baseline Treated	Calculated Impervious Baseline Untreated	Restoration Target (20%)
Triadelphia Reservoir (Brighton Dam)	1,511.9	743.9	274.9	469.0	
Little Patuxent River	8,145.6	7,057.1	1,646.3	5,410.8	
Middle Patuxent River	2,953.9	2,187.3	651.0	1,536.2	
Patapsco River L N Br	3,611.2	2,929.7	880.4	2,049.3	
Patuxent River Upper	372.6	309.8	113.2	196.6	
Rocky Gorge Dam	471.0	311.9	81.8	230.2	
South Branch Patapsco	661.8	236.0	86.0	150.0	
Countywide	17,728.0	13,775.7	3,733.6	10,042.0	2,008.4

Impervious Area Restoration Progress Through FY18

A summary of the impervious restoration progress made by Howard County is included in Table 11 below and detailed in the report submitted with this annual report titled Howard County Impervious *Restoration Accounting: Revised Methodology and Results* (KCI, 2018). Projects and programs completed after June 20, 2010 and up through the end of FY18 (June 30, 2018) are considered to be restoration and are applied to meeting the 20% target. The results indicate that the County has completed 1,871.5 impervious acres of restoration (18.6%) to apply to its 20% goal, leaving 136.9 acres of impervious restoration to be completed by the end of the permit

term. Details of the specific projects implemented, and their associated impervious reductions and cost can be found in the County's NPDES geodatabase and in the Financial Assurance Plan (FAP) both submitted with this annual report.

Table 11: Impervious Area Restoration FY18 Progress Summary in Acres

Watershed	Restoration Progress through FY18
Permanent Credits	
Triadelphia Reservoir (Brighton Dam)	98.9
Little Patuxent River	727.7
Middle Patuxent River	246.0
Patapsco River L N Br	215.8
Patuxent River Upper	0.1
Rocky Gorge Dam	9.6
South Branch Patapsco	15.7
Subtotal Permanent Credits	1,313.9
Annual Practice Credits	
Inlet and Pipe Cleaning	38.9
Street Sweeping	359.8
Septic Pump-outs	158.9
Subtotal Annual Credits	
Total Countywide Impervious Restoration	1,871.5
% Impervious Treated	18.6%
Remaining Impervious Restoration Acres	136.9

Impervious Area Restoration Planned Progress

Howard County has many projects programmed for the FY19 and FY20 periods that overlap with the remainder of its NPDES permit period through December 2019 (Table 12). Projects anticipated for completion in FY21 are also included as these projects will be credited towards the County's TMDL progress and potentially towards progress required of the next MS4 permit.

Completion of the FY19 and FY20 projects is expected to be enough for the County to reach the 20% impervious restoration goal. The County has purposely programmed more projects than necessary to reach the goal as an adaptive management measure, in the event that certain projects are delayed or not feasible.

Table 12: Planned Projects FY19-FY21

Watershed and BMP Type	# Practices	Drainage Area (Acres)	Length (Linear Feet)
FY19			
Brighton Dam	1	0.0	4,500.0
Stream Restoration	1	n/a	4,500.0
Little Patuxent River	38	192.9	5,362.6
Bioretention	24	12.9	n/a
Outfall Stabilization*	5	n/a	688.8
Stream Restoration	2	n/a	4,673.8
Wet Pond/Wetland	7	179.9	n/a

Watershed and BMP Type	# Practices	Drainage Area (Acres)	Length (Linear Feet)
Middle Patuxent River	6	130.5	0.0
Bioretention	3	0.4	n/a
Infiltration	1	0.3	n/a
Wet Pond/Wetland	2	129.8	n/a
Patapsco River Lower North Branch	23	109.4	1,547.8
Bioretention	7	0.4	n/a
BioSwale	1	0.1	n/a
Infiltration	8	0.2	n/a
Outfall Stabilization*	4	n/a	810.5
Stream Restoration	1	n/a	737.3
Wet Pond/Wetland	2	108.7	n/a
Patuxent River Upper	3	0.0	1,478.0
Stream Restoration	3	n/a	1,478.0
Rocky Gorge Dam	2	0.1	0.0
Bioretention	2	0.1	n/a
South Branch Patapsco	1	41.9	0.0
Wet Pond/Wetland	1	41.9	n/a
2020			
Little Patuxent River	9	137.6	3,618.4
Stream Restoration	5	n/a	3,618.4
Wet Pond/Wetland	4	137.6	n/a
Middle Patuxent River	2	92.6	0.0
Wet Pond/Wetland	1	92.6	n/a
Patapsco River Lower North Branch	10	239.8	8,879.5
Outfall Stabilization*	1	n/a	300.0
Stream Restoration	4	n/a	8,579.5
Wet Pond/Wetland	5	239.8	n/a
2021			
Little Patuxent River	5	1.1	1,475.0
Stream Restoration	2	n/a	1,475.0
Wet Pond/Wetland	3	1.1	n/a
Middle Patuxent River	3	32.9	1,161.0
Outfall Stabilization*	1	n/a	36.0
Stream Restoration	1	n/a	1,125.0
Wet Pond/Wetland	1	32.9	n/a
Patapsco River Lower North Branch	4	34.6	5,617.2
Stream Restoration	3	n/a	5,617.2
Wet Pond/Wetland	1	34.6	n/a
Rocky Gorge Dam	3	0.0	1,823.7

Watershed and BMP Type	# Practices	Drainage Area (Acres)	Length (Linear Feet)
Outfall Stabilization*	1	n/a	139.0
Stream Restoration	2	n/a	1,684.7
Total	**110**	**1,013.4**	**35,463.2**

*Note that outfall stabilization is credited to impervious reduction but not TMDL pollutant load reductions for TN, TP, TSS

Nutrient Trading

MDE and the Maryland Department of Agriculture dedicated considerable resources to a nutrient trading program that allows nutrient trades that will help Maryland jurisdictions meet their 20% restoration requirement in a cost-effective manner. The option of including nutrient trading to meet the 20% restoration requirement is not included in the County's Plan at this time, but may be included in the future, if necessary.

TMDL Restoration Plan

Local TMDLs

As a requirement of section PART IV.E.2.b of the County's NPDES MS4 permit, the County developed a restoration plan by December 2015 for each SW-WLA approved by EPA prior to the effective date of the permit. As noted previously the County developed the Countywide Implementation Strategy (CIS) in 2015 (submitted with AR20) to address this requirement. A revised CIS was included with the County's last annual report submittal (AR22) in 2017.

There are currently nine final approved TMDLs within Howard County with either an individual or aggregate SW-WLA. A PCB TMDL for the Patuxent was approved by the EPA in September of 2017. Howard County submitted a draft PCB TMDL Restoration Plan for the Tidal Fresh portion of the Patuxent River (PAXTF) to MDE in September 2018. The estimated PCB load from Howard County's MS4 is 208 g/yr for the TMDL baseline year of 2014. The TMDL requires a 99.9% reduction in PCB load. A review of available data found no sites with confirmed PCB contamination in the Howard County portion of the watershed. Because there were no known sites of contamination, a Source Targeting Analysis was conducted to identify specific locations with potential for PCB contamination, such as sites with known leaks from transformers, and industry types that are known to use PCBs or be secondarily contaminated with PCBs. The Source Targeting analysis showed that the Little Patuxent River subwatershed had the greatest concentration of sites with potential PCB contamination, followed by the Middle Patuxent River subwatershed.

Modeling was used to quantify the reduction in PCB loads that could be achieved with implementation of sediment-reducing BMPs. Since PCBs are strongly bound to sediment, sediment removal will remove PCBs. BMPs implemented to meet impervious restoration requirements and other TMDLs will help to reduce PCB loading. This includes both structural BMPs and programmatic BMPs, such as street sweeping and pipe and inlet cleaning. Implementation of restoration sediment-reducing BMPs through FY18 results in a 8.04 g/yr reduction that equates to a 3.9% restoration reduction percent. The expected PCB load reduction from BMPs implemented since the TMDL baseline, and proposed BMPs, is 58.55 g/yr, or about 28% of the required load reduction. In order to achieve the 99.9% reduction in PCB load, monitoring will be used to narrow down source areas and identify sources of PCBs in the Howard County PAXTF watershed. The County will continue to track progress of sediment-reducing BMPs, reporting on the associated PCB load reductions, and comparing results to the expected load reductions. The County will take an adaptive management approach and will reevaluate treatment strategies as well as methods for estimating PCB load reductions as monitoring studies progress.

Table 13 indicates the local TMDLs that the County is currently addressing. Although there are sediment and phosphorus TMDLs established for Centennial Lake (approved April 2002) and a bacteria TMDL established for the lower segment of the Patuxent River Upper (approved August 2011), they do not have SW-WLAs assigned to the Howard County MS4 source sector and are therefore not included in the County's TMDL requirements. The Triadelphia Reservoir has a sediment TMDL; however, the County MS4 Phase I urban sector requires a 0% reduction in baseline sediment loads and will not be addressed further. South Branch Patapsco does not have a local TMDL, but it is included in the analysis since it, with the Patapsco River Lower North Branch, makes up the Baltimore Harbor watershed. The Middle Patuxent watershed does not have a local TMDL. Attachment B of the County's current permit also lists a mercury impairment in Cash Lake in the Patuxent River Upper Watershed on the list of Howard County TMDLs with applicable SW-WLAs. Cash Lake and its drainage area are located wholly within Prince George's County, therefore Howard County is not responsible for this TMDL and it is not included.

Table 13 also presents disaggregated and calibrated baseline loads for each SW-WLA to calculate the load reduction required from the baseline value. It is noted that the Patapsco River LNB bacteria TMDL is 75% reduction in a smaller subwatershed (PAT0148) and not across the entire watershed.

Based on MDE guidance, growth in the stormwater load since the TMDL baseline year is not accounted for in the analysis. Local TMDLs are considered met, from a planning perspective, when the load reductions associated with restoration progress coupled with the planned restoration load reductions included in the County's database exceed the load reduction required. Some TMDLs are estimated to be exceeded by a wide margin because removals per pollutant type are not achieved at the same rate. TN removal rates are relatively low compared to TP and TSS on a per project basis. This impacts watersheds with multiple TMDLs and also nested watersheds as in Baltimore Harbor.

Table 13: Howard County Local TMDL Summary

Watershed Name	Watershed Number	WLA Type	Pollutant and Units	Baseline Year	Baseline Load	MDE Published Reduction
Patapsco River Lower North Branch	02130906	Individual	Sediment EOS lbs/yr	2005	6,123,442	10.0%
		Aggregate	Bacteria MPN/100m L/yr	2005	21,826	75%
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	Aggregate	Nitrogen EOS lbs/yr	1995	107,059	15.0%
	02130908					
	02130906	Aggregate	Phosphorus EOS lbs/yr	1995	6,546	15.0%
	02130908					
Patuxent River Tidal Fresh	Subshed PAXTF	Aggregate	PCB g/yr	2014	208	99.9%
Patuxent River Upper	02131104	Individual	Sediment EOS lbs/yr	2005	145,902	11.40%

Little Patuxent River	02131105	Individual	Sediment EOS lbs/yr	2005	10,346,821	48.10%
Rocky Gorge Reservoir	02131107	Aggregate	Phosphorus EOS lbs/yr	2000	861	15%
Triadelphia Reservoir (Brighton Dam)	02131108	Aggregate	Phosphorus EOS lbs/yr	2000	2,654	15%
		Aggregate	Sediment EOS lbs/yr	2000	NA	0%

Chesapeake Bay TMDL

The Chesapeake Bay TMDL, established by the EPA (EPA, 2010), sets pollution limits for nitrogen, phosphorus, and sediment in the Chesapeake Bay Watershed. While not a requirement in the County's NPDES MS4 permit, strategies provided in this plan to meet local TMDL reduction targets and impervious restoration treatment are also modeled against the Bay TMDL goals in order to calculate progress. The County's MS4 permit is requiring compliance with the Chesapeake Bay TMDL for the stormwater sector through the use of the 20% impervious surface restoration strategy.

Management Measures

Management measures to reduce pollutant loads and restore impervious surfaces include structural stormwater BMPs, alternative practices, and also non-structural County based and homeowner-implemented programs. The major project types accounted for towards the reduction goals are presented in Table 12. These include projects currently identified in the County's Capital Improvement Plan (CIP) list. Details of the specific planned projects and their associated pollutant reductions can be found in the County's NPDES geodatabase and in the FAP both submitted with this annual report.

Load Reductions

Load reductions achieved from restoration projects implemented from each individual TMDL baseline year through FY18 and load reductions to be achieved with planned implementation of the projects and programs detailed in the County's NPDES geodatabase and FAP are presented in Table 14. .

Table 14: SW-WLA FY18 Progress and Planned Reductions Summary

	Baltimore Harbor		Little Patuxent	Patapsco R LN Branch		Patuxent River	Patuxent R Upper	Rocky Gorge Reservoir	Brighton Dam
	TN-EOS lbs/yr	TP-EOS lbs/yr	TSS-EOS lbs/yr	TSS-EOS lbs/yr	Bacteria MPN/100mL/yr	PCB g/yr	TSS-EOS lbs/yr	TP-EOS lbs/yr	TP-EOS lbs/yr
Reduction Targets									
TMDL Baseline Year	1995	1995	2005	2005	2003	2014	2005	2000	2000
Baseline Load	107,059	6,546	10,346,821	6,123,442	21,826	208	145,902	861	2,654
Target % Reduction	15.0%	15.0%	48.1%	10.0%	75.0%	99.9%	11.4%	15.0%	15.0%
Calibrated Target Reduction	16,059	982	4,976,821	612,344	16,370	208	16,633	129	398
Calibrated TMDL WLA	91,000	5,564	5,370,000	5,511,098	5,457	0.1	129,269	732	2,256
Current Reductions – 2018 Progress									
Restoration Reductions (from baseline to present)	7,621	1,848	2,992,057	2,324,305	88	8	10,625	466	56
Restoration BMPs	*6,793*	*1,516*	2,845,735	2,232,225	88	8	4,490	417	7
Inlet Cleaning	228	91	6,883	27,344	0	0	426	6	0
Street Sweeping	601	240	139,439	64,737	0	0	5,709	43	48
Restoration Reduction %	7.1%	28.2%	28.9%	38.0%	0.4%	3.9%	7.3%	54.2%	2.1%
Reduction Remaining	8,438	-866	1,984,764	-1,711,961	16,282	200	6,008	-337	342
Reduction Percent Remaining	7.9%	-13.2%	19.2%	-28.0%	74.6%	96%	4.1%	-39.2%	12.9%
Planned Reductions									
Planned Reductions	8,438	1,519	1,984,764	1,022,212	17,050	51	56,373	214	802
FY19 – FY21 Credit Year	3,222	1,519	700,596	1,022,212	680	51	56,373	214	802
Additional Projects	5,216		1,284,168						
Pet Waste					16,370				
Restoration Reduction %	7.9%	23.2%	19.2%	16.7%	78.1%	24.3%	38.6%	24.8%	30.2%
Totals (Current + Planned)									
Reduction (current + planned)	16,059	3,366	4,976,821	3,346,517	17,138	59	66,998	680	857
Reduction % (current + planned)	15.0%	51.4%	48.1%	54.7%	78.5%	28.1%	45.9%	79.0%	32.3%
Reduction Remaining for Treatment	0	-2,384	0	-2,734,173	-768	149	-50,365	-551	-459

Cost and Schedule

Details of the specific planned projects and their associated load reductions and cost can be found in the County's NPDES geodatabase and in FAP both submitted with this annual report. The County's local TMDL implementation schedule with end dates is included in Table 15. As stated in Howard County's PCB TMDL restoration plan, the final date for meeting the required load reductions will be determined based on the results of the first part of implementation and the Targeted Reduction Strategy.

Table 15: Implementation Schedule with End Dates Indicated

Watershed	Fiscal Year												
	18	19	20	21	22	23	24	25	26	27	28	29	30
Little Patuxent									2025				
Middle Patuxent				No local TMDL									
Patuxent River TF			To be determined after Part I implementation										
Patuxent River Upper			2019										
Rocky Gorge Reservoir			2019										
Triadelphia Reservoir				2020									
Baltimore Harbor													2029
South Branch Patapsco													
Patapsco LNB													2029

[1] Primary project completion period is shown in green, additional implementation contingent period for each TMDL are in blue.

[2] Baltimore Harbor TMDL includes the South Branch Patapsco and Patapsco Lower North Branch watersheds. There is no local TMDL specifically for the South Branch Patapsco.

Adaptive Management

The MS4 permit calls for an iterative and adaptive plan for implementation. The County will monitor implementation progress on a regular basis and will report progress, load reductions achieved, and impervious surface reductions to MDE with the NPDES Annual Update and at required milestone intervals. The County will review the revised CIS annually and make plan adaptations based on the results. If new methods of stormwater treatment are identified, or better approaches to source control are found, the plans can be extended and updated to take these changes into account. Similarly, if some elements of the plans are not as successful as expected, adaptations and improvements will be incorporated in future updates. Plans may also change if pollutant removal crediting methods are modified in the future. The Chesapeake Bay Program (CBP) recently finalized the development of the Phase 6 version of the Chesapeake Bay Watershed Model (P6 Model). The changes in P6 loading and reduction rates may change current local TMDL progress and anticipated load reductions from planned BMPs. It is the County's understanding that new pollutant load reductions and impervious acre equivalencies will be included in the forthcoming updates to MDE's Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated guidance (MDE, 2014) in 2019.

3. Public Participation

Howard County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. Howard County shall provide:

a. Notice in a local newspaper and the County's website outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;
b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;
c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and
d. A summary in each annual report of how the County addressed or will address any material comment received from the public.

Annual Update Number 23 Status

Little Patuxent and Middle Patuxent Watershed Assessments
For the Little Patuxent and Middle Patuxent Watershed Assessments the County provided public notice in the Howard County Times legal section on June 4, 2015 and November 19, 2015 as well as on the County public meeting webpage and the SWMD webpage. A general press release noting the meetings was also available to local media outlets. The press release and legal ad noted when the watershed assessment and restoration plans would be available to begin the 30-day review period. Public meetings were held on the following:

Table 16: Little Patuxent River and Middle Patuxent River Watershed Assessment Public Meeting Schedule

Date	*Watershed*	*Time*	*Location*
6/17/2015	Southern Middle Patuxent	7:00 pm – 8:30 pm	Robinson Nature Center
6/22/2015	Northern Little Patuxent	7:00 pm – 8:30 pm	Dunloggin Middle School
6/24/2015	Southern Little Patuxent	7:00 pm – 8:30 pm	Hammond High School
6/30/2015	Northern Middle Patuxent	7:30 pm – 9:00 pm	Folly Quarter Middle School
Date	**Watershed**	**Time**	**Location**
12/2/2015	Northern Middle Patuxent	6:30 pm – 8:00 pm	Gary J. Arthur Community Center
12/3/2015	Southern Little Patuxent	6:30 pm – 8:00 pm	North Laurel Community Center
12/9/2015	Southern Middle Patuxent	6:30 pm – 8:00 pm	Robinson Nature Center
12/10/2015	Northern Little Patuxent	6:30 pm – 8:00 pm	Howard Community College

In addition to the public notice provided in the Howard County Times, postcards were mailed with meeting invitation encouraging the residents within the watershed(s) to attend the public meeting(s). All public meeting attendees were given the opportunity to comment on issues and goals of the watershed assessment.

The County investigated any issues brought to our attention and reviewed any comments received on the watershed assessments. During the public meetings only comments about specific problems on individual properties were received. We have followed up on all of them, either by meeting with the property owner and/or by adding the site to the watershed assessment.

After the public meetings, both the watershed assessments and the Countywide Implementation Strategy (CIS) reports were made available for public review and comment for a minimum 30 days. The County received comments on both documents from the Chesapeake Bay Foundation (CBF) and also received comments from a citizen regarding the CIS only. These were the only comments received. The MS4 Permit requires a summary of how the County addressed or will address material comments received from the public, which we are providing as follows:

1. Commenters noted that the summary tables indicate that the nitrogen reductions required by the Bay TMDL will not be met.
Response: The computations and tables provided in these documents are based on a portion of the projects identified in the LP/MP Study and projecting a similar number of sites for the yet to be completed Patapsco and Main Patuxent watershed study (currently underway). While nearly 800 potential projects were identified in the LP/MP Study it was only practical to prepare concept plans for 148 of those sites. The loading computations in the reports are based on the 148 sites with concept plans but there are obviously well more sites available for future projects, which can supply added nutrient reductions. The CIS shows that the only local TMDL reduction target for nitrogen, which is in the South Branch Patapsco Watershed, will be exceeded. Also, MDE's Basis for Final Determination to Issue Howard County's NPDES MS4 Permit notes that the 20% restoration strategy will meet the necessary reductions for interim and long term Bay restoration milestones. The Permit itself states in Part VI Section A (Special Programmatic Conditions, Chesapeake Bay Restoration by 2025) that compliance with the Chesapeake Bay TMDL is required using the 20% restoration strategy within the five year permit term. No changes to either study have been made based on this comment.

2. CBF is concerned that stream restoration is the predominant type of project identified in the LP/MP Study. They contend that without doing upland infiltration and flow reduction stream projects often fail and they further state that stream projects are not cost effective.
Response: The County has been doing stream restoration projects for more than 10 years and our first hand experience over that time shows stream projects to be very cost-effective. Except for one or two times where we've needed to do localized repairs, which were done by manual labor or with a small piece of equipment, the projects have been successful. The upland infiltration and flow reduction would most likely be spread out on multiple private properties, which are typically more problematic and less cost-effective both short and long term. The County can only recommend that private property owners put in rain gardens, dry wells, rain barrels, or other techniques for upland controls, but we cannot mandate their installation and we have no long term control over these voluntary BMPs. Furthermore these facilities will require inspections and routine maintenance, which adds costs to the County and time/costs to the private property owners. Anecdotally we are finding that many property owners with these types of ESD devices that are required by development regulations are filling them in and/or requesting that they be removed from their property. The County certainly promotes the use of voluntary BMPs on private properties such as rain gardens, swales, dry wells, rain barrels, and tree planting, but it is not prudent nor within our control to use these BMPs as a predominant means for achieving our restoration and TMDL goals. For

example, as shown in the CIS, 586 rain barrels were given away by the County in four years, and these rain barrels account for only 0.3 acres of impervious area treatment. While rain barrels are good educational tools for teaching residents about water quality, they are clearly not the most cost-effective or efficient solution to meeting the short-term goals and requirements of the MS4 Permit. No changes to either study have been made based on this comment.

3. CBF notes that the restoration projects considered and recommended are unduly limited to publicly owned land.
Response: This statement is incorrect as close to 75% of the projects identified by the LP/MP Study are on private property. No changes to either study have been made based on this comment.

4. CBF recommends considering additional prioritization or performance factors when selecting projects for recommendation, such as permanence and maintenance costs.
Response: The County's prioritization approach in the LP/MP Study has already considered many factors including permanence and maintenance. While there might not have been specific line items with these two titles they have certainly been considered. We will try to make this more apparent in the current Patapsco/Main Patuxent watershed study. No changes to either study have been made based on this comment.

5. CBF suggests that timeframes for permit compliance and final wasteload allocation (WLA) targets appear to be inconsistent with the deadlines under the permit and Bay TMDL.
Response: The County has specifically used the aggressive MS4 permit and the Bay TMDL deadlines for providing a plan to meet both dates. Local TMDLs do not have a deadline yet, but the County feels that we have suggested an equally aggressive schedule for meeting the local TMDLs, which are known at this time. No changes to either study have been made based on this comment.

6. CBF questions taking restoration and nutrient reduction credit for the stabilization of storm drain outfalls.
Response: The County intends on using restoration techniques in the MDE accounting documents to address the storm drain outfalls so taking restoration and nutrient reduction credit is proper. No changes to either study have been made based on this comment.

7. CBF states that citizen programs noted on pages 44-50 of the CIS are not accounted for in future load reduction projections.
Response: It is the County's intent to continue citizen programs that are found to be productive and help us to ultimately meet our goals and we will continue to look for new citizen programs. Examples of these programs include many current incentive programs to promote localized BMPs such as rain gardens, rain barrels, and tree planting. We are currently looking at a new incentive program relative to septic system maintenance. It should also be noted that the County performs many citizen related efforts, foremost of which is public education, which are not officially creditable through MDE's accounting documents; however we continue to pursue these efforts that help improve the quality of the waterways in the County, which ultimately helps the Bay. No changes to either study have been made based on this comment.

Mainstem Patuxent and Patuxent River Watershed Assessments
Watershed assessments for the Mainstem Patuxent River and Patapsco River Watersheds were performed in 2016. The Mainstem Patuxent River is made up of the Brighton Dam/Triadelphia Reservoir Watershed, the Rocky Gorge Reservoir Watershed, and the Upper Patuxent River Watershed. The Mainstem Patapsco River Watershed is made up of the Lower North Branch and the South Branch Patapsco River Watersheds. For the Mainstem Patuxent River and Patapsco River Watershed Assessments the County provided public notice for round 1 of the

public meetings in the Howard County Times legal section on June 9, 2016 and for round 2 on January 5, 2017 as well as on the County public meeting webpage and the SWMD webpage. A general press release noting the meetings was also available to local media outlets. The press release and legal ad noted when the watershed assessment and restoration plans would be available to begin the 30-day review period. Public meetings dates and times for the Mainstem Patuxent River and Patapsco River Watershed Assessments are following:

Table 17: Mainstem Patuxent River and Patapsco River Watershed Assessment Public Meeting Schedule

Date	Watershed	Time	Location
6/21/2016	Rocky Gorge Reservoir and Upper Patuxent River	7:00 pm – 8:30 pm	North Laurel Community Center
6/23/2016	Lower North Branch Patapsco	7:30 pm – 9:00 pm	Roger Carter Community Center
6/28/2016	South Branch Patapsco and Brighton Dam/Triadelphia Reservoir	7:00 pm – 8:30 pm	Gary J. Arthur Community Center
Date	**Watershed**	**Time**	**Location**
1/23/2017	Mainstem Patuxent River	7:00 pm – 8:30 pm	Gary J. Arthur Community Center
1/26/2017	Mainstem Patapsco River	7:00 pm – 8:30 pm	Roger Carter Community Center

No public comments were received on the Mainstem Patuxent River and Patapsco River Watershed Assessments themselves. The County investigated any issues brought to our attention at the public meetings, which were limited to comments about specific problems on individual properties. We have followed up on all of them, either by meeting with the property owner or performing site reviews and relaying the issues to the proper County agencies.

4. TMDL Compliance

Howard County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Howard County shall further provide:

a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;

b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;

c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;

d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and

e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.

Annual Update Number 23 Status

The reporting items requested under permit condition E.4.a-e are based on the 2018 progress evaluation presented in the County's NPDES geodatabase through the end of fiscal year 2017 (June 30), and the planned management and restoration strategies. A detailed accounting of the stormwater BMPs, alternate practices and programs implemented through 2018 is included in the County's NPDES geodatabase and FAP. The analytical methods used to calculate the reductions are presented in the CIS. Progress results are summarized here to address the permit condition.

Pollutant Load Reduction

Baseline, target, permit and current loads for nutrient, sediment, and bacteria local TMDLs are presented in the MDE_NPDES_MS4 geodatabase table LocalStormwaterWatershedAssessment. Countywide baseline, target, permit and current loads are presented in the MDE_NPDES_MS4 geodatabase table CountywideStormwaterWatershedAssessment.

Baseline and target loads including modeling approach and projects included in each of the models are described, in detail, in the CIS. All County completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives through 7/18/2014 were modeled in MAST to calculate 2014 permit loads, while all treatment through 6/30/2018 were modeled in MAST to calculate 2018 current loads.

Item E.4.a requests the net change in pollutant loads reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives. Additionally, item E.4.b requires a comparison to the County's SW-WLAs. Taken together these requests are focused on the progress made in addressing local TMDL SW-WLAs. Therefore the County considers this request to include restoration projects and programs completed from the baseline SW-WLA year (which differs between watersheds) to the current year.

Load reductions achieved from restoration projects implemented from each individual TMDL baseline year through FY18 and load reductions to be achieved with planned implementation of the projects and programs detailed in the County's NPDES geodatabase and FAP are presented in Table 18.

Table 18: SW-WLA Progress Reductions as of 2018

Watershed Name	Watershed Number	Pollutant	Calibrated Target Reduction (EOS)[1]	Reduction Percent Required	2018 Progress Reduction (EOS)[1]	2018 Progress Reduction Percent
Patapsco River Lower North Branch	02130906	Sediment	612,344	10.0%	2,324,305	38.0%
		Bacteria	16,370	75%	88	0.4%
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	Nitrogen	16,059	15.0%	7,621	7.1%
	02130908					
	02130906	Phosphorus	982	15.0%	1,848	28.2%
	02130908					
Patuxent River	PAXTF	PCB	207.8	99.9%	8	3.9%
Patuxent River Upper	02131104	Sediment	16,633	11.40%	10,625	7.3%
Little Patuxent River	02131105	Sediment	4,976,821	48.10%	2,992,057	28.9%
Rocky Gorge Reservoir	02131107	Phosphorus	129	15%	466	54.2%
Triadelphia Reservoir (Brighton Dam)	02131108	Phosphorus	398	15%	56	2.1%
		Sediment	--	0%	--	--

[1] EOS is Edge of Stream, all values in lbs/yr except for bacteria which is MPN/100 mL/yr and PCB which is g/yr.

With BMP implementation through FY18, three local TMDLs have been met including the phosphorus Baltimore Harbor TMDL, sediment Patapsco LNB TMDL and phosphorus Rocky Gorge Reservoir TMDL. See Table 17 above for detailed comparisons of WLAs, and comparisons between the progress loads and the required WLA and reduction. Some TMDLs are projected to be far exceeded because removals per pollutant type are not achieved at the same rate. This occurs in watersheds with more than one pollutant type with a SW-WLA, and in nested watersheds. TN removal rates are relatively low compared to TP and TSS on a per project basis. For example, the number of projects needed to meet the Baltimore Harbor TN reduction goal resulted in overachieving on the TP reduction, and the TSS reduction in the Patapsco River LNB which is nested in the Baltimore Harbor watershed.

FY18 current loads increased for three local TMDL watersheds including Brighton Dam, Little Patuxent, and Patuxent River Upper when compared to FY17 results presented in last year's annual report. The increased loads are a result of a change in modeling approach, not a decrease in BMP implementation (i.e., less progress BMPs in FY18). BMP load reductions for FY17 progress stream restorations were not modeled in MAST and resulted in higher reductions. For example, SWM BMP and stream restoration implementation in the Patuxent River Upper watershed did not change between FY17 and FY18; however, load reductions modeled in MAST were 1,300 TSS EOS lbs/yr less than they were when modeled outside of MAST in 2017. The County anticipates

there will be additional changes to local TMDL modeled results in next year's analysis due to future modeling using CAST CBP P6 in 2019.
There is the potential to claim cross-jurisdictional baseline load reductions for three MDOTSHA stream restoration projects located within the Little Patuxent watershed. MDOTSHA is planning 5,700 linear feet of stream restoration in FY2019 with an estimated load reduction of 418,380 TSS EOS lbs/yr. After applying the load reductions from the three MDOTSHA stream restoration projects, Howard County's Little Patuxent TSS local TMDL baseline load would be 9,928,441 TSS EOS lbs/yr with a target reduction of 4,775,580 TSS EOS lbs/yr. With the revised target reduction, Howard County's FY18 restoration reduction percent is 30.1% with 1,783,523 TSS EOS lbs/yr remaining (18% reduction) by the 2025 target year.

Progress bacteria load reductions have decreased in FY18 when compared to FY17 even though BMP implementation has not changed. The decreased load reductions are the result of drainage area data that appears to have changed for three bioretention BMPs and the County is looking into it. This difference does not affect planned efforts to meet the TMDL requirement by the 2029 target year.

Cost of Completed Projects

The County's FY18 capital budget for restoration projects (pond retrofits, stream restoration) was $12 million. Annual costs for street sweeping are $230,000 and for inlet cleaning are $100,000. To date the County has encumbered approximately $69.5 million for projects completed through FY18. The County is submitting a draft of FAP with Annual Report 23. The FAP details the cost of programs and projects to meet the impervious surface treatment.

Cost of Planned Projects and Programs

The cost of implementing the CIS to meet the stated goals has been estimated and was revised in this year's FAP. It is important to note that the costs represent planning level estimates for use in high level forecast budgeting with many assumptions made. The cost estimates provided in the CIS and FAP will likely adjust as the County progresses with implementation of its program.

The total cost to implement all practices currently described in the County's plans is $159,400,000. This total cost includes all SWM Division CIP restoration BMPs along with costs from additional practices (i.e., rain barrels, septic pump-outs and upgrades, street sweeping, inlet cleaning and Howard EcoWorks) from FY19 – FY20 ($2,000,000) as well as costs from FY21 – FY29 ($7,425,000) needed to fulfill the local TMDL targets by FY29. The County's fiscal year schedule of planned projects and estimated project implementation cost is presented in Table 19. Details of the planned projects and cost for the next two years (i.e., 2019 and 2020) are presented in the FAP. The schedule of projects and implementation costs for the timeframe after 2021 are from CIS planning and are subject to change.

The Chesapeake Bay Program (CBP) recently finalized the development of the Phase 6 version of the Chesapeake Bay Watershed Model (P6 Model). The changes in P6 loading and reduction rates may change current local TMDL progress and anticipated load reductions from planned BMPs. It is the County's understanding that new pollutant load reductions and impervious acre equivalencies will be included in the forthcoming updates to MDE's Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated guidance (MDE, 2014) in 2019. As such, all local TMDLs will be re-evaluated to assess current progress in 2019. The County will refer to projects identified in the watershed assessments if additional planning is needed to meet local TMDL requirements.

Table 19: Fiscal Year Schedule of Project Implementation Cost

Fiscal Year	Number of Planned Projects	Total (in millions)
2019	76	$20.8
2020	24	$17.0
2021	17	$15.4
2022	20	$15.4
2023	19	$14.6
2024	21	$16.1
2025	21	$15.8
2026	20	$15.0
2027	20	$15.0
2028	19	$14.3
Total	257	$159.4

F. Assessment of Controls

Howard County and ten other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on the existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

The County shall continue monitoring in the Wilde Lake and Red Hill Branch watersheds, or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:

a. Chemical Monitoring

- **i.** ***Eight (8) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;***

ii. ***Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;***

iii. ***At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:***

Biochemical Oxygen Demand (BOD_5)	***Total Lead***
Total Kjeldahl Nitrogen (TKN)	***Total Copper***
Nitrate plus Nitrite	***Total Zinc***
Total Suspended Solids	***Total Phosphorus***
Total Petroleum Hydrocarbons (TPH)	***Hardness***
E. coli or enterococcus	

iv. ***Continuous flow measurements shall be recorded at both in-stream monitoring stations or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant load estimates shall be reported according to any EPA approved TMDLs with a stormwater WLAs.***

b. Biological Monitoring

i. ***Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and instream monitoring locations or other practical locations based on an approved study design; and***

ii. ***The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.***

c. Physical Monitoring

i. ***A geomorphologic stream assessment shall be conducted in the Red Hill Branch watershed monitoring location or in a reasonable area based on an approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;***

ii. ***A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and***

iii. ***A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.***

d. Annual Data Submittal

The County shall describe in detail its monitoring activities for the previous year and include the following:

i. ***EMCs submitted on MDE's long-term monitoring database as specified in PART V below;***

ii. ***Chemical, biological, and physical monitoring results and a combined analysis for approved monitoring locations; and***

iii. ***Any requests and accompanying justifications for proposed modifications to the monitoring program.***

Annual Update Number 23 Status

Watershed Restoration Assessment

Wilde Lake Monitoring

In 2006, the County began monitoring in the Wilde Lake watershed, and continued annually through the present reporting year. The Wilde Lake monitoring program includes geomorphic, chemical, physical habitat, and biological assessments conducted throughout the watershed to determine if the restoration efforts outlined in the *Centennial and Wilde Lake Watershed Restoration Plan* (CWP, 2005) are succeeding in reducing pollutant loading and increasing the health of the lakes and streams. The goal of the monitoring strategy is to assess the overall condition rather than focusing on specific sites. Additional detail on monitoring in Wilde Lake and results can be found in *Wilde Lake Watershed Discharge Characterization, Stream Monitoring and Watershed Assessment, Year Thirteen – 2018.*

Stormflow data were collected at Wilde Lake on September 20, October 9, October 24, and October 29, 2017, and February 4, March 1, April 3, April 25, and June 10, 2018. Baseflow data were collected on September 20, November 15, 2017 and January 10, February 21, May 4, and June 15, 2018. Average (2007-2018) concentrations of Cadmium, Copper and Zinc in storm flows at the Wilde Lake sampling site have been consistently below their associated acute criteria set by MDE, with six of eight storms having an EMC for Lead greater than the chronic criteria and no storms greater than the acute criteria. The average Lead value is greater than the chronic criteria published by MDE. TSS levels in stormflow samples continue to be elevated, but not greater than the published chronic criteria, as would be expected during storm events in urban streams. *E. coli* counts from stormwater were well above the published water quality criteria during 2015-2018, similar results to previously analyzed fecal coliform counts (2006-2015) which were also consistently high.

Biological monitoring was conducted in Spring 2018 at five sites in the Wilde Lake watershed. This was the 13th consecutive year of monitoring at Wilde Lake, which began in the spring of 2006. Sites sampled in 2018 were repeat visits of sites sampled in 2008 and again in 2013. Results of the Year 13 biological and physical habitat assessments in Wilde Lake indicated that the streams varied in habitat quality, but were only marginally capable of supporting aquatic life. Benthic macroinvertebrate sampling results from 2018 were similar to 2017 with all sites showing a degraded urban stream condition with three sites in the 'Very Poor' range and two sites rated 'Poor'. Two of the five sampling sites had RBP habitat that rated 'Partially Supporting' and three rated 'Not Supporting'. MBSS's Physical Habitat Index (PHI) rated three sites as 'Severely Degraded', one site 'Degraded' and one site 'Partially Degraded'. Overall, the stream system in the Wilde Lake watershed exhibits evidence of the urban stressors affecting it and has not demonstrated marked improvement over the thirteen years of monitoring.

Since 2006, a yearly geomorphic assessment has been conducted during the spring at sites throughout the Wilde Lake watershed. Assessment occurs at the same locations each year. The main goal of the monitoring is to assess the temporal variability of the geomorphic stability of the stream channels upstream of the lakes as they react to restoration activities. Overall, upstream improvements in the watershed do not appear to have significantly improved the habitat in the tributary streams. Based on 2006 – 2018 geomorphic assessments, the Wilde Lake

mainstem continues to degrade with localized major changes in channel section and profile, especially in the downstream most reach. Changes in bed features include bank erosion, bar formation, and high sediment supply. Sediment deposition and transport are common with significant point bar and mid-channel accumulations in some areas. Bed and bank erosion is most evident along the downstream profile. Upstream reaches are not experiencing the same level of erosion as the downstream reach and have remained relatively stable over 2017-2018 period. A riparian buffer is lacking along most of the channel.

In 2007, a complete hydrologic and hydraulic (H&H) model analysis was performed to assess the stability of the mainstem channels in the Wilde Lake watershed. This analysis was repeated in 2009 due to changes observed at monumented cross sections. Since there were no significant changes in land use since 2007 the hydrologic results from 2009 TR-20 analysis were used in the 2017-18 H&H analysis. The hydraulics of the subject streams were modeled using the Hydrologic Engineering Center's River Analysis System (HEC-RAS) model, developed by the Army Corps of Engineers. Cross-section geometry was previously developed from digital data from Howard County and combined with KCI field survey. The field survey data was updated for the four cross sections which were surveyed having significant changes. A total of 19 cross-sections were used in the HEC-RAS model for Wilde Lake. These include the 4 monumented cross-sections surveyed annually. Similar to the 2009 modeling results, the Wilde Lake channels for each storm show a shear stress above the critical values from a Shields diagram analysis which would indicate erosion as the dominant channel process. When compared to 2009, values appear to be moving toward a more stable channel for some of the cross sections but moving towards more active erosion for others.

Red Hill Branch Monitoring

In 2009, the County began monitoring in the Red Hill Branch watershed, which has continued annually since its inception. The Red Hill Branch monitoring program includes geomorphic, chemical, physical habitat, and biological assessments conducted within and downstream of restoration projects to determine if the restoration are succeeding in reducing pollutant loading and increasing the health of the stream system. What follows is a brief summary of monitoring activities and results for 2018. More detail and results can be found in the annual report, *Red Hill Branch Restoration Monitoring Year 9–2018.*

Stormflow data were collected at the permanent water quality monitoring station at the Red Hill Branch site at Meadowbrook Park on August 7, October 30, 2017, February 4, February 10, March 1, April 25, June 10, and July 17, 2018. Baseflow samples were also collected on September 20, November 15, 2017, and January 10, February 21, May 4, and June 15, 2017. Event mean concentrations of storm runoff ranged from 1.44 – 2.36 mg/mL for total nitrogen, 34 – 312 mg/mL for TSS, and 0.15 – 0.32 mg/mL for total phosphorus. Average metal concentrations at Meadowbrook Park were below their respective acute MDE criteria for Copper and Zinc, but slightly above for Lead (EMC 0.0030 mg/L; chronic criteria 0.0025 mg/L). *E. coli* levels for all samples were well above the published water quality criteria.

A total of eight storm events were sampled at the Red Hill Branch – Bramhope Lane stream restoration site during 2017-2018. Storms were sampled on September 5, October 24, and November 19, 2017, February 4, February 7, April 25, May 22, and July 17, 2018. Baseflow samples were also collected at these sites on September 20, and November 15, 2017, January 10, February 21, May 4, and June 15, 2018. For the upstream site event mean concentrations ranged from 1.79 – 3.90 mg/mL for total nitrogen, 9 – 169 mg/mL for TSS, and 0.17 – 0.65 mg/mL

for total phosphorus. At the downstream Bramhope site event mean concentrations ranged from 1.62 – 2.90 mg/mL for total nitrogen, 2 – 91 mg/mL for TSS, and 0.10 – 0.50 mg/mL for total phosphorus.

Eight storm events were also sampled at the Salterforth pond retrofit site during 2017-2018. Storms were sampled on November 7, 2017, and February 4, February 10, March 1, April 25, May 22, June 10, and July 17, 2018. For the inflow site event mean concentrations ranged from 1.21 – 2.56 mg/mL for total nitrogen, 3 – 54 mg/mL for TSS, and 0.16 – 0.38 mg/mL for total phosphorus. At the outfall site event mean concentrations ranged from 1.20 – 3.84 mg/mL for total nitrogen, 1 – 19 mg/mL for TSS, and 0.18 – 0.50 mg/mL for total phosphorus.

A biological monitoring program was initiated in Red Hill Branch during the spring of 2010 and has continued annually. The program includes the collection and analysis of the macroinvertebrate community, physical habitat assessments, and measurements of *in situ* water chemistry. Biological assessments involve macroinvertebrate sampling at three sites located at the downstream end of the major drainage areas within the Red Hill Branch subwatershed as well as a fourth control site located in an adjacent watershed. The monitoring stations are being used for the assessment of restoration activities in this watershed. In Red Hill Branch, post-restoration monitoring results indicate a subwatershed in an overall degraded ecological condition, with little change from the first two years of pre-restoration monitoring. During 2018, all four sites were classified as 'Poor' for biological condition, with BIBI scores of from 2.67 to 2.00. Habitat assessments during 2018 showed mixed results with all three Red Hill Branch sites rated 'Degraded' and the control rated 'Severely Degraded' for the Maryland PHI and classified as 'Non Supporting' for the control site and 'Partially Supporting' for each of the three Red Hill Branch sites for the RBP habitat assessment . The biological community and habitat fluctuate slightly from year-to-year but remain in a degraded condition and have not shown any significant improvement after restoration.

Geomorphic assessments in the Red Hill Branch subwatershed were conducted in May of 2018, seven years after the completion of the Bramhope Lane stream restoration project, to evaluate the effectiveness of this and other restoration projects undertaken in this subwatershed. Assessments were conducted at three sites, one within the lower portion of the restoration site, one downstream of the restoration site, and one on a similar channel in an adjacent watershed intended to serve as a control. Assessment included longitudinal profiles, permanently monumented cross-section surveys, pebble counts, substrate facies mapping, bulk-bar sample sieve analysis, and measurement of bed/bank pins and scour chains. In the years prior to restoration at all three reaches, bed features exhibited evidence of the continually shifting, dynamic nature of these urban systems, including deposition in some pools and bars, deepening of other pools, and shifting locations of riffle crests. At the two unrestored reaches, conditions have continued to be variable over the seven years of post-restoration monitoring with periods of erosion and deposition with the trend toward channel widening and deepening. After restoration, there has been far less change in channel dimensions and profile, and notably less erosion during post restoration monitoring at the restoration reach. The restored reach is relatively stable with only small areas of erosion and deposition.

Dorsey Hall Monitoring

The County began monitoring sites in Dorsey Hall project area in 2014 to assess new restoration activities in the Red Hill Branch watershed located downstream of the sites at Meadowbrook Park, Bramhope Lane stream restoration, and the Salterforth pond retrofit. Two sites were added, one on Red Hill Branch at Columbia Rd downstream of all restoration activities, and one site near the downstream end of Plumtree Branch upstream of its confluence with Red Hill Branch to measure effects of stormwater coming from the untreated Plumtree Branch. At each site chemical, biological, and physical habitat monitoring have been conducted annually. Full results of

the monitoring are included in the report, *Dorsey Hall Restoration, Year 4, 2017-2018, Restoration Conditions Monitoring.*

Chemical monitoring consists of baseflow and stormflow chemical sampling for nitrogen, phosphorus, and sediment. Seven storm events were sampled at the Columbia Road and Plumtree Run sites during 2017-2018. Storms were sampled on September 5, October 30, and December 5, 2017, January 28, February 7, March 1, and May 13, 2018. Baseflow samples were also collected at these sites on September 20, and November 15, 2017, January 10, February 21, May 4, and June 15, 2018. For the Columbia Rd site event mean concentrations ranged from 1.47 – 2.45 mg/mL for total nitrogen, 3 – 130 mg/mL for TSS, and 0.07 – 0.34 mg/mL for total phosphorus. At the Plumtree site event mean concentrations ranged from 1.50 – 2.39 mg/mL for total nitrogen, 3 – 263 mg/mL for TSS, and 0.08 – 0.48 mg/mL for total phosphorus.

Biological and physical habitat monitoring was conducted at these sites during summer of 2018 and narrative ratings for both sites were the same as those from 2017. Both sites rated 'Poor' for biological condition, with the Columbia Rd scoring a 2.00 and Plumtree scoring 2.33. Maryland's PHI results for the Dorsey Hall sites show both sites falling into the lowest 'Severely Degraded' category with scores of 47.4 for Columbia Rd and 33.2 for Plumtree. The RBP habitat results were similar with both sites in the 'Not Supporting' category with scores of 52.5% and 54.5% of reference. The physical habitat results show that both sites are severely impacted, most likely from urban development with no evidence of ecological uplift after restoration.

Turf Valley Monitoring

To evaluate potential improvements in water quality that may occur as a result of planned restoration projects in the Turf Valley project area, Howard County began conducting pre-restoration monitoring in 2014 with plans to continue monitoring annually. The Turf Valley projects are located on the headwaters of the Little Patuxent River between Turf Valley Road and Bethany Lane. The County is conducting biological monitoring at three sites, one each at the downstream end of two tributaries to the Little Patuxent River and also on the mainstem just below all of the planned restoration. This reporting period includes the first round of pre-restoration monitoring conducted in 2014, a combination of pre- and post-restoration monitoring in 2015, and post-restoration monitoring starting in 2016. Full methods and results are in the report, *Turf Valley Restoration, Year 5, 2017-2018, Restoration Conditions Monitoring.*

Biological and physical habitat monitoring was conducted at these during summer of 2018. Results of the biological monitoring show that the two tributary sites are in poor condition, each falling in the 'Poor' category from 2014 – 2018 with scores varying between 2.00 and 2.67 each year. The mainstem Little Patuxent site is in better condition, rating in the 'Fair' category each year, scoring a 3.00 each year prior to 2017, 3.33 in 2017, and a 3.33 again in 2018. The RBP physical habitat scores have varied year-to-year at the two tributary sites, decreasing in 2015 from the initial assessments in 2014, but returning to similar scores and ratings in 2016, 2017 and 2018. The RBP scores at the mainstem Little Patuxent have remained stable over the five years of data. All three sites scored in the 'Partially Supporting' category during 2018. Maryland PHI scores and ratings at the two tributary sites scored similar to 2017, with the pond retrofit site scoring 'Degraded' and the stream restoration site scoring 'Partially Degraded'. The PHI scores at the Little Patuxent site, similar to the RBP scores, have remained relatively consistent across the five years of data. Biological and habitat scores do not show evidence of ecological uplift after construction of the restoration and retrofit projects in the Turf Valley area.

Annual Data Submittal

Monitoring reports associated with Assessment of Controls monitoring including the programs summarized above, and the Rumsey Run Stormwater Management Assessment described below, can be found in the narrative files associated with the NPDES Geodatabase submittal. Also included are the monitoring site locations and drainage areas in the MonitoringSite and MonitoringDrainageArea feature classes.

The required chemical monitoring results and EMCs are found in the County's geodatabase submittal in the ChemicalMonitoring table for Wilde Lake and Meadowbrook (Red Hill). The County chose again this year to also report on other monitoring that is being conducted above the NPDES requirements at several sites. These sites are partially funded by Chesapeake and Atlantic Coastal Bays funding and are focused on assessing watershed restoration, therefore the County chose to include them. Because they are not NPDES compliance specific sites, they do not have all data as required by the NPDES permit. These sites are associated with the Dorsey Hall project (Plumtree - PT and Columbia Road - CR) and the Red Hill monitoring at Brampton Hills (aka Bramhope Lane, Upstream - BH01, Downstream, BH02). For these sites data from FY18 were added to previously submitted data from FY16 and FY17.

The required biological monitoring data are included in the BiologicalMonitoring table for the Wilde Lake and Red Hill monitoring projects. As with the chemical data, there are additional biological data submitted for the Dorsey Hall and Turf Valley monitoring projects.

At this time, the County has no requests for modification to its monitoring program.

2. Stormwater Management Assessment

The County shall continue monitoring the Rumsey Run (tributary to Red Hill Branch) watershed, or select and submit for MDE's approval an alternative project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

- ***a. An annual stream profile and survey of permanently monumented cross-sections in Rumsey Run to evaluate channel stability in conjunction with surrounding and on-going commercial development;***
- ***b. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and***
- ***c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.***

<u>Annual Update Number 23 Status</u>

In 2011, to evaluate the effectiveness of recent stormwater controls from developed sites for stream channel protection, Howard County and MDE chose an unnamed tributary to Red Hill Branch (hereafter called Rumsey Run) within the Red Hill Branch subwatershed for analysis. The County is monitoring the effectiveness of the 2000 Maryland Stormwater Design Manual and other innovative stormwater management technologies through geomorphic assessments, limited runoff investigations, and modeling in Rumsey Run. A full report of Rumsey Run monitoring methods, data analysis, and results are provided in the *Evaluation of Maryland Stormwater*

Management Methods in Rumsey Run Year 7 – 2018 report, produced as a stand-alone document and submitted as part of the Annual Update.

Overall results suggest that the stormwater management practices in the drainage areas of the middle and lower reaches are having a positive effect on the maintaining the stability of the stream. The middle reach receives drainage from the newest development which was constructed with ESD practices for stormwater management and with MDE 2000 channel protection criteria. This reach was overall very stable and contained the cross sections with the least amount of measured change in terms of cross- sectional area and downcutting observed across all years of monitoring. The upstream end of the middle reach also has a large portion of intact riparian buffer on the left bank, which also likely contributes to the overall stability of the reach. Additionally, since the development in this middle reach is the most recent, the stream has had the least amount of time to show the potential effects of the development, when compared to the other reaches, which have much older development within their drainage areas. Therefore it is possible that over time this area may show similar signs of degradation. The lower reach receives drainage from an older development with pre-2000 stormwater management. The longitudinal profile in this reach was also quite stable, however the banks have experienced some widening over time. Particle size over time has varied the most within this reach. Finally, the upper reach receives drainage from an industrial park with little to no stormwater management and high levels of impervious surfaces. This reach is by far the least stable, with three major headcuts, and cross sections that show the most amount of change over time with significant widening and downcutting. This reach also has the highest overall slope, at 2.1% (compared to 1.6% in the lower reach and 1.3% in the middle reach). It is likely that the lack of stormwater controls, coupled with higher valley and channel slopes in this section have resulted in the observed degradation. Higher slopes will drive higher velocities and shear stress for the same level of discharge as compared with a lower slope segment, like those present in the middle and lower reaches. The lower slopes in those segments are likely buffering the channel from channel bed and bank erosion.

Hydrology and hydraulics models were prepared to compare results from various land use scenarios such as prior to development and development without stormwater controls, to determine the relative benefits of different stormwater controls. The hydrology and hydraulics models were prepared using TR-20 and HEC-RAS developed and updated in previous years of the study. These models were calibrated using precipitation, pond flow, and channel water surface elevation data collected in the field over the last three years of this study. The TR-20 and HEC-RAS models were updated with the 16 cross sections surveyed in 2018. The calibrated HEC-RAS model was used to compute velocities and shear stresses at the cross sections. These computed values along with particle size information from the geomorphic assessment were compared with a published table (Fischenich, 2001) of permissible shear and velocity for channel lining materials to evaluate the relative stability of the channel. Modeled shear stresses and velocities exceed permissible thresholds at all five cross sections. These results imply that the channel is exhibiting unstable characteristics throughout modelled cross sections.

Additional Assessment of Controls:

Countywide Biomonitoring Program

Howard County performs annual Countywide biological stream monitoring to characterize stream and watershed health. There is currently no specific NPDES MS4 requirement to complete this type of monitoring, however the County recognizes the importance in understanding the conditions of its stream systems. Data are used for general characterization, to support watershed assessment and management efforts, and to track conditions over time. Because there is no specific requirement, Howard County is presenting a summary of the program here and current reports are submitted for MDE's use; however specific site locations and site data are not include in the

NPDES geodatabase. The included report is, *Howard County Biological Assessment, 2018, Upper Little Patuxent, Middle Little Patuxent, Lower Little Patuxent Watersheds.*

Program Overview

The Howard County Department of Public Works Stormwater Management Division initiated the Howard County Biological Monitoring and Assessment Program in the spring of 2001. The County initiated the monitoring program to establish a baseline ecological stream condition for all of the County's watersheds. The program involves monitoring the biological health and physical condition of the County's water resources and is designed on a five year rotating basis such that each of the County's 15 watersheds, or primary sampling units (PSU) will be sampled once every five years.

Round 1 was completed from 2001 to 2003, Round 2 from 2005-2009, and Round 3 from 2012-2016, with 10 randomly selected sites sampled in each PSU. The current year of sampling (2018) is the second year of Round 4. To allow for paired site comparisons with previous Rounds, a total of four sites from Round One (2001), Round Two (2005), and Round Three (2012) were selected for resampling in each PSU. The remaining six sites in each PSU were randomly selected.

The monitoring in each round involved sampling instream water quality, collection and analysis of the biological community (benthic macroinvertebrates) using Maryland Biological Stream Survey (MBSS) protocols, cross section analysis, particle size distribution, and assessment of the physical habitat using the United States Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (RBP). The sampling methods used are compatible with those used in the third round (2012-2016) with updates where applicable. All data collection occurred between March 1st and April 30th of 2018, as required by the MBSS protocols.

2018 Results

Biological and physical habitat assessment results for 2018 in Upper Little Patuxent, Middle Little Patuxent, and Lower Little Patuxent indicate watersheds that are moderately impaired. Only one out of thirty benthic macroinvertebrate samples received a rating of 'Good' and six received a 'Fair' rating. The remaining sites (77%) were rated as either 'Poor' or 'Very Poor'.

Overall, the average watershed physical habitat conditions were 'Partially Supporting' (Upper Little Patuxent and Lower Little Patuxent) and 'Non-supporting' (Middle Little Patuxent). The geomorphic assessment reveals a variable system. Using the Rosgen classification system for natural rivers (Rosgen, 1996), almost half (43%) of the channels sampled throughout the subwatersheds were classified as incised F or G channels and the remaining 57% were classified as stable type B, C or E channels. Gravel, sand, and silt/clay were the dominant substrate types in the majority of sampling reaches.

The average percentage of impervious area in the Upper Little Patuxent, Middle Little Patuxent, and Lower Little Patuxent subwatersheds is 18.7%, 27.2%, and 25.8%, respectively. Imperviousness for the areas draining to each sampling site range from as little as 2.0% to a high of 58.5%, both of which occurred in the Middle Little Patuxent watershed.

Pearson correlations between the BIBI scores and all parameters (specific conductivity, percent imperviousness, PHI habitat, and RBP habitat) showed significant relationships. The percentage of imperviousness to each sampling site indicates a negative relationship (correlation coeff.= -0.681, $p < 0.0001$) to BIBI scores, suggesting biological

condition decreases with increased watershed imperviousness. Specific conductivity and BIBI scores also showed a strong negative correlation, (correlation coeff.= -0.402, p = 0.028). These results support the notion that overall water quality and biological health are likely being affected by the amount of development, and hence imperviousness, in the watershed. A strong correlation was also observed between impervious percent and specific conductivity (correlation coeff.= 0.700, p <0.0001), suggesting that increased conductivity is due in large part to urban runoff.

Results of the 2018 assessment indicate impaired biological conditions in all three watersheds, and no statistically significant changes in mean BIBI scores were observed in any of the subwatersheds over time. Average habitat assessment scores were found to be significantly higher in 2006 when compared to all other years. However, this may be a result of the subjectivity of habitat assessment scoring and the fact that different teams conducted the assessments each year.

G. Program Funding

1. ***Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in PART V. below.***

2. ***Adequate program funding to comply with all conditions of this permit maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.***

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Howard County appropriated more than $90 million to implement various aspects of NPDES activities and associated work during permit years FY06 through the first half of FY16 (the first half of FY16 is used since the County's new permit was issued halfway through FY16). The County continues to appropriate significant funding for its current permit, which was issued midway through FY16. Funding for the second half of FY16 through FY19 has exceeded the amount from FY06 through the first half of FY16. The Fiscal Analysis table in the geodatabase database has been completed to report on the funding for the current reporting period.

The database breaks out the funding into capital costs, operational costs, and information on the Watershed Protection and Restoration Fund (WPRF), as well as allowing the County to provide optional breakdowns for more specific task funding including maintenance. Capital costs include but are not limited to stream restoration and SWM construction projects, site-specific post-construction monitoring, and the purchase of monitoring equipment. Operational costs include but are not limited to County staff salaries, supplies, annually repeated expenses such as biological, physical, and chemical monitoring at NPDES program sites, illicit discharge inspections, SWM facility inspections, and public outreach efforts.

The County was selected in FY19 to receive a $2.3 million grant from the Chesapeake and Atlantic Coastal Bays Trust Fund for constructing two water quality projects. These grant funds help the County leverage its available capital funds to be able to complete even more NPDES related water quality projects.

The County intends to maintain an adequate level of funding throughout the current permit term. As noted in previous Annual Updates, all funding shown herein and proposed is subject to yearly approval by the County Council and the County Executive.

Watershed Protection and Restoration Fund (WPRF)
In March of 2013, the County adopted legislation to enact the WPRF to be charged based on the number of 500 square-foot impervious units for all properties. In July of 2013 the legislation was amended to modify the manner in which residential properties were charged based on the size of the parcel. Three tiers were established, and the rates for townhomes, properties less than ¼ acre and properties greater than ¼ acre are charged $15, $45, and $90 per year, respectively. In addition, programs were established to provide reduced fees for agriculturally assessed properties and non-profit properties if they met certain criteria identified that reduced the potential for impact. Further, residential and commercial project reimbursement and fee credit programs were established for property owners that choose to add additional stormwater BMPs to their parcel.

In 2016, Council Resolution CR 37-2016 amended the WPRF Assistance Program for nonresidential properties. The Fee is deemed a hardship for nonresidential properties that do not qualify as not for profits if the Fee exceeds a percentage of the total property tax bill. The property owner then pays a Fee equal to that percentage of the total property tax due for the property. In 2018 the percentage was 5%, which was a 15% decrease from the original hardship percentage cap. The WPRF funds are budgeted among various County agencies to fund programs such as:

- BMP controls to manage stormwater flow and reduce pollutants
- Storm drain infrastructure, operation, repairs and upgrades
- MS4 permit compliance including monitoring and enforcement
- Stormwater education, outreach, and incentive programs

Section III. Program Review and Annual Progress Reporting

A. Annual Reporting

As required by the NPDES permit, the County is submitting all Annual Update Databases electronically using a large file sharing system and on the attached DVD. In addition to the required databases, the SWPPP reports, monitoring reports, and the NPDES Contact List are included as narrative files, and additional Source Identification GIS files are included.

B. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than five years, unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require Howard County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, Howard County shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how the County is meeting the overall goal to ensure that each County watershed has been thoroughly evaluated and its progress in implementing water quality improvements. This application shall be used to gauge the effectiveness of the County's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. ***Howard County's NPDES stormwater program goals;***
2. ***Program summaries for the permit term regarding:***

a. Illicit discharge detection and elimination results;
b. Restoration plan status including County totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;
c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;
d. Impervious acres compared to the baseline and twenty percent restoration requirement in PART IV.E.2.a.; and
e. Other relevant data and information for describing County programs;
3. Program operation and capital improvement costs for the permit term; and
4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this permit.

With this Annual Report 23, Howard County is formally reapplying for NPDES stormwater discharge permit coverage. Howard County's next permit will be the County's fifth-generation NPDES stormwater discharge permit. Program summaries and goals have been presented in this Annual Report for Year 4 as well as in Annual Reports 20, 21, and 22 for Years 1, 2 and 3 of the permit term, respectively. Annual Reports and their associated geodatabase submittals provide the required supporting data for each permit section including but not limited to illicit discharge detection and elimination, restoration plans for water quality improvement, pollutant load reductions for TMDLs, restoration progress and program operation and capital improvement costs. Additional information can be found in the Countywide Implementation Strategy (CIS) submitted to MDE in 2017.

In August 2018, MDE shared with the County draft language of the Assessment of Controls section of the next generation permit. The County met with MDE on September 21, 2018 to discuss the draft permit conditions associated with this section. The County appreciates the opportunity to review and discuss the draft Assessment of Controls section and would be interested in reviewing future iterations of this and any other section of the next generation permit, as it becomes available. At this time, the County is not requesting any specific changes to permit conditions, but may request changes and provide comments on future drafts and tentative determinations of its fifth-generation NPDES stormwater discharge permit.

Section IV. Special Programmatic Conditions

A. Chesapeake Bay Restoration by 2025

A Chesapeake Bay TMDL has been developed by the EPA for the six Bay States (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the District of Columbia.

The TMDL describes the level of effort that will be necessary for meeting water quality criteria and restoring Chesapeake Bay. This permit is requiring compliance with the Chesapeake Bay TMDL through the use of a strategy that calls for the restoration of twenty percent of previously developed impervious land with little or no controls within this five year permit term as described in Maryland's Watershed Implementation Plan. The TMDL is an aggregate of nonpoint sources or the load allocation (LA), and point sources or WLA, and a margin of safety. The State is required to issue NPDES permits to point source discharges that are consistent with the assumptions of any applicable TMDL, including those approved subsequent to permit issuance.

Urban stormwater is defined in the CWA as a point source discharge and will subsequently be a part of Maryland's WLA. The NPDES stormwater permits can play a significant role in regulating pollutants from Maryland's urban sector and in the development of Chesapeake Bay Watershed Implementation Plans. Therefore, Maryland's NPDES stormwater permits issued to Howard County and other municipalities will require coordination with MDE's Watershed Implementation Plan and be used as the regulatory backbone for controlling urban pollutants toward meeting the Chesapeake Bay TMDL by 2025.

B. Comprehensive Planning

Howard County shall cooperate with other agencies during the completion of the Water Resources Element (WRE) as required by the Maryland Economic Growth, Resources Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). Such cooperation shall entail all reasonable actions authorized by law and shall not be restricted by the responsibilities attributed to other entities by separate State statute, including but not limited to reviewing and approving plans and appropriating funds.

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The County recognizes the importance of the Chesapeake Bay restoration effort and has been working with MDE and other municipalities to help achieve the goals of the new 2014 Bay Agreement. The following paragraphs describe Howard County's recent and ongoing participation in programs that address the Chesapeake Bay water quality goals.

Patuxent Reservoirs Technical Advisory Committee

In 1996, Howard County joined Montgomery County, Prince George's County, WSSC, Maryland National Capital Park and Planning Commission (MNCPPC), HSCD, and Montgomery Soil Conservation District (MSCD) in signing the Patuxent Reservoirs Watershed Protection Agreement. The Agreement recognized the importance of protecting the long-term biological, physical and chemical integrity of the watershed. The Agreement established a Policy Board and a Technical Advisory Committee (TAC) to oversee implementation of a protection strategy for the watershed.

TAC member activities have included water quality monitoring and modeling, implementing agricultural best management practices, stormwater retrofits and stream channel restoration, and public outreach and education. The TAC has developed a list of priority resources in the watershed: the reservoirs and drinking water supply; terrestrial habitat; stream systems; aquatic biota; rural character and landscape; and public awareness and stewardship. TAC member agencies continued progress in the following areas: evaluating progress toward TMDL implementation for the Patuxent Reservoirs, agricultural BMP implementation, reservoir monitoring, and public outreach. In 2014, the TAC revised the Patuxent Reservoirs Protection Strategy Memorandum of Understanding, which established an Agricultural BMP Cost Share Program, to make more properties eligible for the program and increase the types of BMPs the program would fund. WSSC and Howard County renewed program funding for HSCD; MSCD still has funds remaining. In 2016 the TAC conducted research related to road salt impacts in the watershed and recommended the Policy Board form an interjurisdictional workgroup to develop a comprehensive salt reduction plan for the watershed. The TAC produces an Annual Update that documents the TAC's accomplishments for the past year and priorities for the upcoming year.

Howard County's major initiatives in the Patuxent Reservoirs watershed include several capital projects as well as ongoing biomonitoring and public outreach activities. One stream restoration known as the Cherry Creek project is complete, and one pond repair/retrofit and a stream restoration project are currently under design in the Cherrytree Farm neighborhood in the Rocky Gorge reservoir watershed. The first round of biomonitoring was

conducted in the reservoirs watershed in 2001 and 2003, and a second round of monitoring was done in the Cattail Creek and Brighton Dam watersheds in 2005 and in the Rocky Gorge watershed in 2009. The third and fourth rounds of biomonitoring were conducted in 2012 and 2017 in the Upper and Lower Brighton Dam and Cattail Creek watersheds.

Patuxent River Commission

Howard County is a member of the Patuxent River Commission. The Commission provides oversight for implementation of the Patuxent River Policy Plan and development of the Chesapeake Bay Watershed Implementation Plan (WIP). The Policy Plan is a land management strategy to reduce nonpoint source pollution, and protect and restore habitat in the Patuxent River watershed. The WIP specifies actions to achieve pollutant load reductions from wastewater treatment plants, septic systems, agriculture and urban stormwater, to meet the Chesapeake Bay Total Maximum Daily Loads for nitrogen, phosphorus and sediment. In 2014, the Commission adopted an update to the Policy Plan to reflect the new Bay TMDLs. This update was subsequently adopted by the local member jurisdictions, including Howard County, and approved by the Maryland General Assembly in 2016. For more information about the Patuxent River Commission, please see the Maryland Department of Planning web page at
http://www.mdp.state.md.us/OurWork/PatuxentRiverCommInfo.shtml .

Water Resources Element

The Howard County Water Resources Element (WRE), adopted in April 2010, is an amendment to PlanHoward 2030 that adds Policies and Actions intended to ensure that the County has adequate water resource capacities to meet future growth needs through 2030. In particular, the WRE seeks to ensure a safe and adequate supply of drinking water, and adequate land and water capacity for the treatment of wastewater and stormwater. The WRE reflects the opportunities and limitations presented by local and regional water resources. It is intended to improve protection of land and water resources and to address water resource goals within the context of local and State smart growth policies. For more information on the WRE, please see the County web page at
https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Utilities/Tech-Support-Division/Bureau-of-Utilities-Water-Resources-Element.

Cooperative Project with the U.S. Geological Survey

Howard County continues cost-sharing for the cost to operate a U.S. Geological Survey (USGS) flow gauging station on the Little Patuxent River near Savage, MD.

Maryland Water Monitoring Council

The County continues to participate in the MWMC's annual conferences, which are held at the Maritime Institute in Linthicum, MD. This year's conference was held on December 7, 2018.

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Attachment - Database DVD